STATE LIBRARY OF PENNSYLVANIA
3 0144 00134179 1

PHF 1.17/4
no 1-55
c 2

STATE LIBRARY OF PENNSYLVANIA
[illegible]
Government Publications Section

Pennsylvania Health Bulletin

425712

PUBLISHED BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., COMMISSIONER

No. 1. HARRISBURG, PA. JULY, 1909

WITHDRAWN

The Disease-Breeding Power of House-flies and the best Methods of Prevention

Until recent years it was the current belief that the house-fly was solely a beneficient insect, owing to the fact that in its larval or early stages it destroys effete and offensive substances prejudicial to the health of mankind. At the present time it is known to be a dangerous enemy and every effort should be made to destroy it. It is much more economical for man to exert himself to destroy filth than to permit flies to live to do that work.

When horses are kept near a residence it is good economy to build a pit for the manure along the lines of that designed by the Pennsylvania State Department of Health and shown in the accompanying sketch. This prevents flies from infesting a neighborhood.

This insect conveys the causes of disease in a purely mechanical way by carrying germs on its feet, hairy legs, sucking proboscis or mouth parts. It has the habit of alighting on all kinds of substances, particularly food and excrementitious matter and in this way is a medium for the direct transmission of the germs of disease. If it were not possible for man to get rid of the waste products which are destroyed by flies in some better way, flies would be necessary, but owing to their disease carrying tendency and their great danger to humanity it becomes necessary for human beings to destroy these effete substances and not leave them to the maggots or fly larvae.

The diseases disseminated by flies in the summer and fall are caused by microscopic plants called bacteria and popularly known as germs. When taken into the human body these germs are liable to produce the different diseases of which they are the specific causes.

In the rural districts, in camp life, and to a lesser degree in towns and cities, the house-fly is an active agent in the transmission of typhoid or enteric fever. This disease is caused by a bacterium known as the *Bacillus typhosus* and this causative agent is thrown off from the body of the patient in the fecal matter and urine. If house-flies settle on material containing these germs of disease and then rest and feed on the food of human beings the latter are very likely to acquire the disease.

This is a most direct and virulent method of transmission. During the Spanish-American War less than three hundred Americans were killed in battle and nearly five thousand died of disease, the greater number from typhoid fever which could largely be accounted for through the house-flies.

The foot, and the proboscis or tongue of this insect, are particularly adapted for picking up germ-laden material. Its body, feet and legs are very hairy and are also well supplied with bristles. When walking on a rough surface it clings by the aid of two minute hooks and when on a smooth surface, like glass, it uses an organ known as the pulvillus, which secretes a fluid. The tongue is rather long and flesh-like and is admirably adapted for picking up and conveying germ-laden matter.

They are the agents in the causation of germ diseases produced by the introduction of germs into the digestive tract through our food. They also convey germs to and from open wounds. As pointed out by Dr. Joseph Leidy, late President of the Academy of Natural Sciences of Philadelphia, much of the hospital gangrene during the civil war was from this cause.

Flies are a great source of milk contamination and thereby a factor in the causation of intestinal diseases in children. A single fly may carry as many as 6,600,000 bacteria. Intestinal disease is more frequent wherever and whenever flies are most abundant, and they, and not the heat of summer, are the active agents in its spread.

House-flies have long been suspected of being factors in the dissemination of cholera. That they contaminate the food of the well from the vomit or dejecta of those ill from the disease, in times of epidemics, is undeniable. The worst cholera months are those in which these insects are most abundant. They may also carry tuberculosis by settling on sputum containing the cause of the malady, the *bacillus tuberculosis,* and then infecting food. They will also feed on sputum and a number of observers have shown that ingested sputum encloses virulent tubercle bacilli in fly specks (excrement), and that the bacilli may remain virulent several weeks thus protected. Pus from discharging sinuses and fecal matter from tuberculous patients are also sources of danger in this respect.

The house-fly *(Musca domestica)* lays about one hundred and twenty white elongate, cylindrical eggs, a little smaller and more pointed at the anterior end than at the posterior. They are from .04 to .05 of an inch in length and about .01 inch in diameter. In shape they are more or less like slender grains of wheat and have a groove on the side. The eggs are usually deposited in masses by the female in the crevices of warm or moist horse manure. Heat and moisture are required for their normal development and they hatch in about twenty-four hours after being laid. The freshly hatched larvae or maggots are .07 inch in length, tapering or pointed at the head end and blunt at the other. When fully grown they are from .25 to .40 inch in length. They moult or change their skins three times, and the entire life of the larva is from five to seven days. After the third moult it changes into an inactive or resting stage called the pupa. This is a small, elongate, brown, segmented object, rounded at the ends, and contains the chrysalis. This latter stage lasts from five to seven days, when the fly (imago) or perfect insect appears. There may be from eight to fourteen broods annually, depending on climate and other factors. It has been calculated that the progeny of a single female fly may be 14,067,792,000,000,000 individuals at the end of the twelfth generation, provided they all live. They breed in horse-manure, decayed vegetables, decayed meats, cow-dung, fowls' dung, human excrement, ashes comtaminated with decayed vegetable or animal matter or in rags soiled by such materials. The vast majority of them however breed in horse-manure.

Flies should never be allowed to settle on food of any kind and various methods have been devised to prevent this, such as wire screens and sticky papers. For their destruction, poison papers, wire traps, fumigation with pyrethrum or Persian insect powder, wire gauze on the end of a wooden handle for crushing, are all more or less useful under varying conditions. Pyrethrum powder may be placed in a pan on a hot stove or heated by other means. The powder should not burn only smoulder. It gives off a dense white smoke that will kill flies, but is otherwise harmless. One ounce should be used to each hundred cubic feet of air space. Rooms during and after fumigation should be tightly closed. After opening, the dead or stupefied flies should be carefully swept up and burned. A piece of wire gauze eight inches long and five inches wide, tacked to a wooden handle fourteen inches long, makes an effective beater for striking and killing small numbers of flies in dwelling houses.

The keynote to the situation is prevention. Horse-manure bears about the same relation to the house-fly that stagnant water does to the mosquito. If the fly were prevented from ovipositing in manure and the other materials mentioned, this pest would be to a great extent a thing of the past. Various substances have been mixed with manure to destroy the maggots or fly larvae, such as kerosene, chloride of lime, residual oil, lime and phosphates. Stables should have smooth and hard floors and be kept clean so that there can be no place for manure to accumulate. It should be either utilized at frequent intervals (twice a week), or stored in fly proof bins or screened apartments. A good plan is to ram it tightly into barrels that can be covered in such a way as to prevent access or egress by flies. In towns and villages a good plan would be to have the manure collected twice a week as is done with garbage and ashes. When used in the open as a fertilizer it soon dries and disintegrates and ceases to be a breeding medium for the flies.

Open privies or toilets accessible to flies should not be permitted and stables should be kept clean and free of manure.

All alleys should be kept clean and free from any of the materials in which flies breed.

In sea-coast or river towns there is great danger around wharves where excreta are not properly cared for and where flies are abundant. Such places should be provided with sanitary closets.

Excreta from persons suffering from intestinal diseases should be carefully disinfected immediately on discharge from the body.

All kitchen slops and waste should be kept carefully covered until removed and destroyed .

Houses near railroads should be well screened as flies contaminated with excreta from passing trains may gain access to food in the kitchen or dining room.

Various kinds of food stuffs exposed on the street for sale are potent sources of danger since they are liable to contamination by flies which have walked on or fed on sputum expectorated on the sidewalk. Feather dusters are used by the venders of fruit to brush off the unsightly part of the day's accumulation of street dirt, dried sputum, fly excrement, dessicated horse manure and other offensive material. What the brush misses the purchaser eats. Such exposed foods should be avoided by those having regard for untoward consequences .

The house-fly problem at the present time demands the awakening of the people to the exigencies of the case and the adoption of vigorous preventive measures. The expense incurred to prevent disease from these sources would be more than justified by the results attained.

Things to be Remembered for the Prevention of Disease carried by House-flies

1. Flies can only breed in filth of the kinds mentioned and their presence is evidence that such material is nearby.
2. They carry the cause of disease on their hairy bodies and legs and by means of their mouth parts.
3. Keep them away from the sick, particularly from those suffering with comunicable disease.
4. Do not allow them to settle on the mouth, eyes, ears or nostrils of sleeping infants.
5. They should not be permitted to come in contact with food of any kind or to settle on the milk bottles of infants.

6. Open privy wells or cess-pools are particularly dangerous. Sanitary closets should be used.

7. Physicians should see that the excreta of all persons with intestinal disease are cared for in accordance with the regulations of this Department.

8. Manure should be collected twice a week and spread on the fields or stored in fly-proof receptacles.

A MODEL MANURE PIT

The manure pit shown in the illustration is 30 feet long by 12 feet wide in plan and 9 feet deep from the floor to the top of the wall. It is constructed with a concrete foundation and a wooden superstructure with an asbestos shingle roof. The concrete walls extend to a height of 5 feet 6 inches above the floor and are 9 inches thick. The floor is constructed of 3 inches of concrete laid in blocks 7 feet 6 inches by 6 inches.

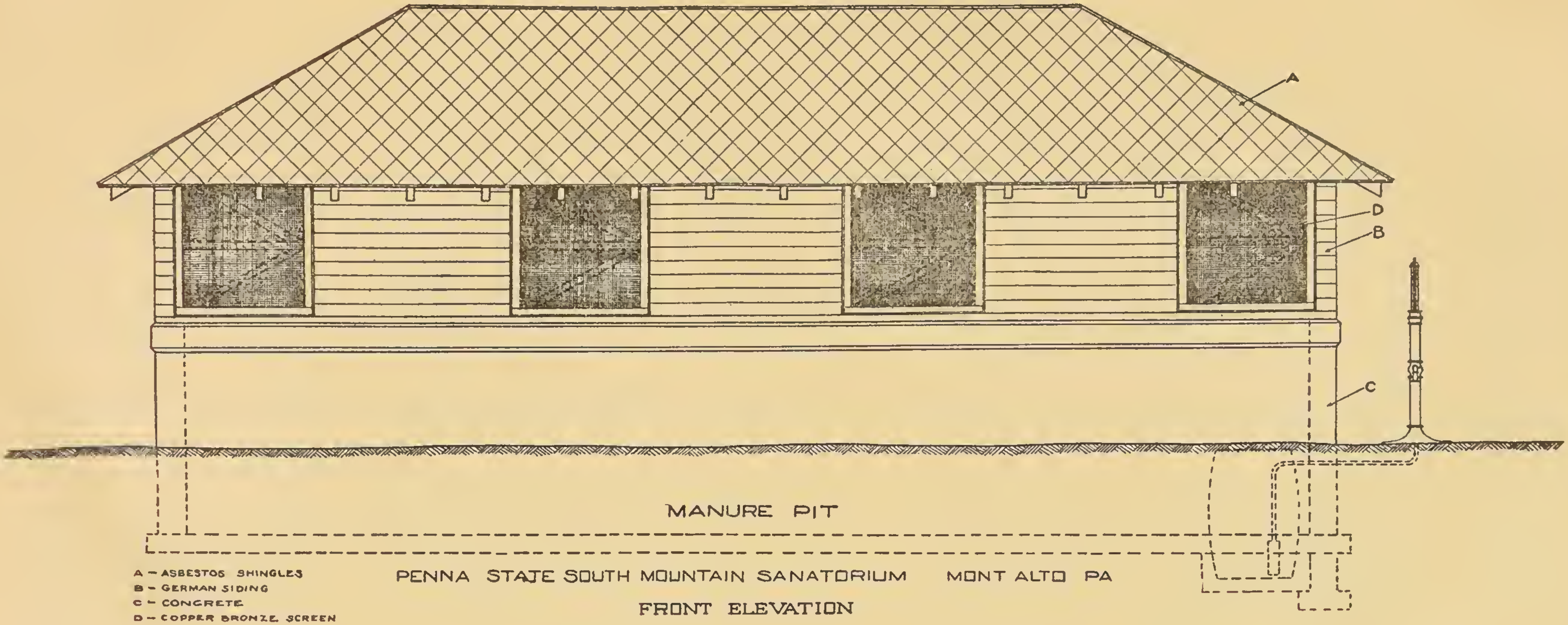
A 2 by 6 wooden sill is laid on top of the concrete wall and is held to it by bolts imbedded in the concrete and spaced 3 feet center to center. On this sill rests the frame work of the building which is constructed of 2 by 6s and sheeted on the exterior with German siding.

The roof is supported by 2 by 6 rafters and is composed of 1 inch sheathing covered with asbestos shingles laid in the diamond pattern.

The illustration shows the front elevation of this manure pit which is on the lower side opposite to the barn. The ground on this side as shown in the illustration is graded to an elevation 3 feet above the foundation of the walls. On the opposite side of the building next to the barn the grade is carried to the top of the concrete work. There are four doors located on each side of this structure and one in each end. These doors are approximately 4 feet square and consist of a light wooden frame work covered with copper bronze screening of No. 14 gauge.

The manure is hauled from the barn to the doors on the upper side and dumped or forked into the pit. When it is necessary to empty the pit it is thrown through the doors on the lower side shown on the illustration into the wagons which can drive along this side of the building.

In one corner of the building, as shown in the illustration, there is located a shallow sump to which the concrete floor slopes from all directions. A perforated barrel is placed in this sump to permit of



PENNA STATE SOUTH MOUNTAIN SANATORIUM MONT ALTO PA

FRONT ELEVATION

the liquids from the manure collecting at this point. A small hand force pump is located to one side of the building on the ground immediately outside and the suction end of this pump is carried through the barrel to the bottom of the sump. The pump is so arranged that a hose connection can be made with the discharge end so as to lead to a tank placed on a wagon, making it a simple matter to draw off the liquids from this sump, that it may be economically used as a fertilizer.

Pennsylvania
Health Bulletin

No. 2. HARRISBURG, PA. AUGUST, 1909

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

WITHDRAWN

NOTE ON THE SIMILARITY OF BARIUM CARBONATE POISONING AND RABIES IN DOGS

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1909

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 2. HARRISBURG, PA. AUGUST, 1909.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Note on the Similarity of Barium Carbonate Poisoning and Rabies in Dogs.

The United States Department of Agriculture recommended some time ago the use of Barium Carbonate as a poison for small rodents. Since then many cases of so-called Rabies have occurred around stables where it was used. This line of experiments was started with the idea of calling attention to the course of symptoms produced by poisoning with this chemical and to emphasize the difference from those of Rabies. We have been able to establish the picture of an acutely fatal dose of this drug and outline, somewhat vaguely however, the effects of very small doses. If the toxic dose be given in a capsule the dog will either vomit the body undissolved or in pieces. At any rate the symptoms appear to a slight extent and then rapidly subside. If, however, natural conditions be approached by giving the drug in milk or meat the course is quite regular. It has been found that a quantity of .2 or .3 gram will kill a dog of 12-15 pounds in eight to fourteen hours. A half starved dog will not always eat the full amount of food given and it seems that he knows the presence of the chemical. About three hours after the dose mentioned above, the dog will seem restless and whining and will probably vomit small quantities of fluid green material in which barium can be found. A little later he will be noticed to drink a small quantity very frequently. A green froth may be present around his lips and teeth. When he drinks there are no convulsive movements of chest, head, jaws or neck. He will next begin to tremble and to lie on his side by preference. A looseness of the bowels occurs first about 4 hours after giving the poison. The passages have no special sign of recognition at this time, but later will be fluid and green. Vomiting continues with considerable regularity about every quarter hour, and the vomitus has the same characters. Thirst increases and the animal may consume a gallon in the last three or four hours that he is able to stand. , Much is of course vomited. Urination is not frequent. In the urine barium has not been found, but in the stools, early in the course of the symptoms, the tests are positive. *About 5 hours after receiving .2 to .3 gram a palsy of the posterior extremities appears*, which rapidly progresses to paralysis. If this latter appear, the dog never recovers. The paralysis advances to the anterior extremities and neck in another hour and in 8 hours all the body is motionless except the eyes. The temperature is increased during this stage by from 1 to 2 degrees Fahrenheit. In the earlier stages it is variable, sometimes being normal, at others slightly above. Toward the end when paralysis is complete the temperature falls to about normal or a little below. In Barium Carbonate poisoning there is a notable slowing of the heart action, similar to digitalis effect. It begins to decrease in frequency about the 5th hour and from then until just before death, will run down to 60 to 64. A few minutes before death, the pulse becomes rapid, thready and cannot be counted. The abdomen begins to swell about 3 hours before death. This is probably due to intestinal paralysis, because the small gut is enormously distended and the peristaltic movements were absent in one dog killed a few minutes before death would naturally have ensued. The animal finally dies from respiratory failure.

During the course the animal will rarely eat. When non-lethal doses have been given, he may take a little food after the critical height of his symptoms has passed. At no time is there any suggestion of convulsive movements of pharynx, larynx, or the general musculature. The animal is entirely tractable and seems to desire to be helped in drinking and eating. He prefers, however, to lie quietly in the darkest corner of his enclosure. From all our animals which received a lethal dose of barium carbonate, emulsions made from the worm, cerebellar hemispheres, and Ammon's horn have been injected subdurally in the crania of rabbits. No one of them showed any symptoms, either of rabies or barium carbonate poisoning. Microscopical preparations of smears from these brains and sections made from fixed tissue failed to show any bodies which could be thought of as Negri bodies. The notes of the post mortem given below show central congestion and edema but none of the proliferative changes found in rabies nor the rabies nodules of Babes.

When small repeated doses are given, (.01 gram at 3 P. M. used in this work) the effect is transient. There may be a little vomiting with very pronounced distaste for food on that day. On the morning after the dose, two or three rather loose stools may be found in the cage. The dog then proceeds to take food and water with relish. One dog was given 8 doses in three weeks, losing only 4 ounces in weight. This quantity would seem to approximate what a dog might pick up around a stable on stray objects which have been soiled with the drug or carried by vermin. We have never seen in this part of our work any course closely comparable to the picture of rabies or of acute poisoning as outlined above.

The following is an autopsy report on one of our dogs. The picture is very clear as against that of Rabies.

Dog No. 5, Autopsy performed 9 hours after death.

Well preserved, well nourished dog, evidence of vomiting, frothy mouth, mucous membrane of the mouth slightly congested.

Lungs congested and edematous with a narrow rim of emphysema just beneath the pleura. No consolidation.

Lymph glands small, soft, homogeneous, congested and anthracotic.

Heart distended, stopped in diastole. Chambers distended, with dark semi-clotted blood; in the conus arteriosus chicken fat clot. Muscle pale, homogeneous except near auriculo-ventricular septum, where it and the areolar tissue are congested. Valves are negative and seem competent.

Liver normal in size, form and consistency. Edges sharp, section uniformly congested, slightly opaque and shows dense capillary congestion.

Spleen normal in size and color. Slightly softer than normal. Uniform on capsule. Section shows slightly hyperplastic follicles with congested pulp especially around the follicles. Trabeculae not visible.

Kidneys normal in size, shape and color. Capsule smooth, strips with a little difficulty but does not tear the surface. The normal purple zone between the cortex and medulla has a pale area in the middle, thus giving the impression of two purple lines, one at the junction and one in the medulla. The striae are normal, glomeruli not visible.

Stomach, congested on serosa, slightly foul, gray, granular fluid; mucosa is dull, pale, purple color; the rugae are not enlarged, but slightly more tortuous than normal.

Pylorus is normal; the gall duct is patulous, the gall bladder is filled with dark viscid brown fluid. Mucosa of the duodenum is swollen, especially at the tops of the folds, and the evidence of violent contraction may be seen in the alternate pale and congested areas from the mucosa all the way through to the serosa. The jejenum is violently congested, mucosa soft and almost entirely disintegrated in places while in others it maintains its position. In the ileum the mucosa becomes paler and there are many sub-mucous hemorrhages varying from 1 to 5 m.m. in diameter; still further on, the mucosa becomes almost normal in color and consistency, and the gut contains only a little tenacious yellow mucus. No food is present in any place. Ileocecal valve is normal in color and the cecum contains a little inspissated feces; the longititudinal folds are swollen and more tortuous than normal, and their tops are markedly congested, almost hemorrhagic.

Brain; dura fairly adherent along the longitudinal fissure, otherwise negative. Brain itself slightly congested on the surface. Section negative. Section of cerebellum into the brain of rabbit No. 35. Section of cerebral cortex into rabbit No. 33. Section of Ammon's horn into rabbit No. 34. None of these rabbits developed anything abnormal.

MICROSCOPICAL NOTES.

(1) Cerebellum; there are to be noted more or less evidences of oedema, and cytolytic changes involving the cells of Purkinje. No appearances at all suggested Negri bodies.

(2) In the section of cornu Ammonis there are minor evidences of oedema from the rather large spaces about the large multipolar cells and blood vessels; but the ganglionic cells are practically normal. In the cerebral cortex less marked oedema and a moderate injection of the pial vessels exist; and the ganglionic cells here show slight retrograde changes, much less marked, however, than in case of the cerebellum.

(3) Cardiac muscle; presumably from the shape of the section taken from the right ventricular wall, shows some slight loss in the definiteness of the transverse striations and at places a little undue granularity of the muscle substance (probably a slight cloudy swelling). It is not marked and there are no other features of importance noted.

(4) Wall of stomach, section taken from the cardiac end shows nothing of importance. There is a slight loss of the surface epithelium, which may well be from artefact. The glands are large, the acid cells particularly prominent and well defined; the peptic cells less well preserved and smaller. No special injection of the mucosa, although here and there are individual vessels injected with blood. No oedema of this membrane. The wall has in the sections separated below the muscularis mucosa; in this coat a number of the veins are turgid with blood. The muscles and outer coat seem practically normal.

(5) Several sections from the small intestine all show more or less catarrhal inflammatory change, injection of vessels, some destruction of surface epithelium and of the villi themselves, a variable but notable number of goblet cells in the crypts, some oedma of the villi and interglandular tissue of the mucosa. Similar congestive and oedematous changes in the submucosa and muscular coats.

(6) Liver; shows as its most marked feature a fairly distributed hyperemia, portal, central and capillary. There is no appreciable abnormality in the capsule or in the perilobular structures. The cells stain well, but are perhaps a little too granular and perhaps slightly swollen,—in neither case very distinct.

(7) Pancreas. This section is poorly shown, probably mainly from same fault in preparation (looks as if overheated). There was evidently a rather marked hyperemia and the tissue seems quite loose (either oedema or artefact.) The cells stain densely and without definition, seem to have largely fused together within the acini.

(8) Kidney, shows widespread injection, involving the arterial as well as the venous side of the circulation of the organ. There is well marked cloudy swelling and at places necrosis and desquamation of the tubular cells of the cortex, and mainly in the tubules, but also in slight measure in the Bowman's capsules, there is more or less granular coagulate of an albuminous exudate. The interstitial tissues are mainly uninvolved, but at places show a little oedematous looseness.

(9) Spleen, capsule normal. Malpighian bodies large and about the peripheries loose and showing a slight perifollicular space because of oedema. Pulp generally markedly congested, not hemorr-

hagic and not pigmented. No special hyperplastic changes in pulp, follicles or trabeculae. Capsule normal. Microscopical diagnosis; oedema of brain, catarrhal enteritis; acute parenchymatous nephritis.

A complete and satisfactory description of the course of canine rabies is not easy to give. Some writers recognize one form with modifications, others two, and still others three forms. It is probable that there is but one true form of rabies, the clinical course being modified by the length and severity of the various stages. Thus we have convulsive rabies, due to the predominance of the second or excited stage while paralytic rabies gets its name from the fact that the excited stage is short while the paralyses appear early and are profound. Further on, a tabulated list of symptoms will be given to differentiate this disease from poisoning by barium carbonate, but in order to fully appreciate the symptoms, a systematic description of rabies symptoms may not be amiss. This description is based upon personal observation and reference to reliable hand books on the disease. The first stage lasts from twelve to forty-eight hours and may be so slight that it is overlooked. The animal is dull, unresponsive, slow in its movements and whines a little. It has a tendency to creep around in dark corners, but will respond when called and even be more than usually lively with people of its own household. It scratches itself, may be restless, or suddenly jumps up and runs without apparent objective point and will as suddenly stop and bark or snap into the air without apparent reason. At this stage there are apparent increased reflexes, because the animal is easily irritated, especially if the person or object be strange. Some dyspnoea follows, accompanied by convulsive contractures of the chest muscles, apparently due to a paroxysm of the diaphragm. The pupils are dilated during the attack. The dog's appetite becomes capricious or entirely perverted and he will eat the most unusual things and refuse his previously preferred articles of food. Next follows some slight difficulty in swallowing and the animal stretches its head and neck forward in the line of his body during the attempt. Food may drop from the mouth in this position. Vomiting occurs because of straining. The animal makes frequent attempts to drink, but can only get a small quantity at a time. There is some difficulty in defecation and urination. It smells around its own genitals and has increased sexual activity. At this time marked salivation appears. The height of the disease is now rapidly approaching; the animal becomes truly mad, but the rabid instinct is directed against inanimate objects for the first part of this stage. becoming aggressive at the height. This second stage is of three or four days' duration. There is rapidly advancing delirium to such an extent that the animal bites and tears at any object which comes in its way, even if that action do it personal harm. For instance, it may bite a live coal. Perhaps its most characteristic behavior consists in suddenly starting to run, which it continues without stopping for long distances, snapping and biting at any thing in his path. Usually it runs away from home until it is tired and will return an abject picture of exhaustion and slink into its kennel without paying attention to anything. Here it will lie in a period of depression, making no noise, with heavy difficult breathing, staring eyes, dilated pupils, dry, livid, hanging tongue, until a fresh attack breaks out, when the delirious running will be repeated. As a rule, the dog makes no sound, but when he does, his voice is changed to a hoarse double sound, combined with a long drawn out howl. This is considered to be characteristic. A short sharp high pitched yelp is often heard also, which should always excite suspicion in those who are familiar with the dog's natural noises. He seems insensible to blows and kicks and may inflict injury on himself in trying to escape from his cage. Swallowing now becomes very difficult and efforts to swallow incite new outbreaks of mania. True hydrophobia (dread of water), is seen in only a small percentage of cases and is probably due purely to thinking of the difficulty of swallowing. All rabid dogs attempt to swallow water frequently in the early stages of the disease. During this stage a peculiar circular or rotary movement of the head may be seen. The picture then rapidly shifts into the depressed or paralytic stage. Toward the end of the second and at the beginning of the third stage the maniacal attacks become less frequent but more active, until they suddenly cease and the animal passes into the complete third stage. The paralysis really begins in the second stage, with the laming of the pharyngeal muscles, but proceeds now to the lower jaw, tongue and eyes. The mouth is always open, the tongue hanging out and becoming dry and livid. The conjunctivae become dull because of the paralysis of the eyelids. The hind extremities are next affected, then the trunk muscles, and lastly the fore extremities. This stage may last from one to five days. During the disease the animal looses considerable weight. The pulse is always rapid and tense. The temperature is usually one to three degrees C. above normal in the active stages, but declines toward the end. In some cases, however, there may be a high post mortem temperature. There is glucose in the urine. At the height of the excited stage a paralysis of the bladder and rectum is sometimes seen.

This forms the classical picture of rabies. In the question concerned in this paper, we must deal with the dumb or paralytic type. This consists of the absence, either relative or total, of the excited stage, the animal passing from the first or irritable stage directly into depression with paralysis. There may be in dumb rabies, a morbid desire to bite, but this is transient and at the time when it is seen there may be already well marked paralysis of the jaw, which prevents a consummation of the attempt. Indeed there may be paralysis of the hind quarters at the same time.

Although the post mortem findings in an animal dead of rabies are not characteristic, and in some ways similar to those in a dog poisoned by barium carbonate, there are some points of distinct difference. Among them the finding of foreign bodies, such as stones, sticks, metal, straw, in the stomach of the rabid dog is most common and suggestive. The mucosa of the stomach is congested, especially on the tips of the rugae, and there may be also some flat erosions, probably due to the foreign bodies. The blood is dark and thick. There is cloudy swelling of the parenchymatous organs. The mucous membranes of the upper respiratory and alimentary tracts are congested and show some punctate hemorrhages. There is congestion and edema of the brain and cord and some vacuolization of the large nerve cells. Around the vessels of the gray matter there may be a round cell and tissue cell infiltration often combined with hyaline thrombosis within the vessels, and small hemorrhages about them. (Rabies nodules.) Endothelial proliferation and granulation in the ganglia was supposed at one time to be characteristic of this disease. They have however, been found in other acute conditions of the nervous system. In the salivary glands there is round cell infiltration with edema and degeneration of the gland cells.

The differences of these clinical courses will appear in a table, but some discussion of their similarity should be made. The dog which has had a lethal dose of barium carbonate and is beginning to show paralysis has the anxious frightened expression of a rabid animal when in quiet delirium. The former is, however, not delirious but can be made to lap a little water in the hand and will give evidence of pleasure at attention. The lapping of the water is done easily and eagerly in barium poisoning while a rabid dog would gladly drink if it were not for the spasmodic contractions in the early stage and the palsy later. In rabies there is no great thirst while the poisoned animal is always thirsty. The poisoned animal shows no animosity toward strangers, an attitude always expected in a rabid animal. The latter frequently seems to be desirous of attracting the attention of its friends however, especially in the paralytic stages. The trembling and vomiting with green foam hanging to the chops afterward are suggestive and alarming, but the trembling is due to the pain in the congested stomach, of which the vomiting is the expression. The froth is probably due to the liberation of Co. 2 when the insoluble barium carbonate is changed to soluble barium chloride in the stomach. The presence of froth always excites fear in a layman. Greater importance should be placed on long strings of tenacious mucus hanging from the mouth, especially at the corners, of an animal running around in an excited state. In convulsions froth or bloody foam is due to rapid clonic contractures of the jaws with salivation, a symptom which does not occur in hydrophobia. When called, before paralysis appears, it will come quietly and stiffly, and refuses to be touched except by familiars. On the whole, however, it is tractable. In rabies the paralytic dyspnoea early in the course should receive attention. In poisoning, there may be a little trembling, deep inspirations after vomitting, but there is no true dyspnoea until the ascending paralysis has reached the chest muscles. We would call especial attention to the slowness of the pulse in the height of barium poisoning and its rapidity in rabies. In reference to the frequent long aimless runnings of rabid animals, it must be said that these do not always occur in the typical case, and quite seldom occur in the short excited stage of the so-called paralytic form. In poisoning this never occurs. The short pained yelp and the long drawn howl are characteristic. The pained whine of the poisoned animal is not characteristic. The two conditions will be shown side by side in the following chart by which I think any one may easily differentiate them.

BARIUM CARBONATE POISONING.	RABIES.
(1) First symptoms restless, nervous whining, vomiting small quantity fluid green material—condition develops rapidly.	(1) Condition develops insidiously, nervous, quiet, keeping in dark corners; no especial vomiting.
(2) Next will drink frequently.	(2) No great thirst at this time.
(3) Trembling slightly, irritable.	(3) Trembling, irritable.
(4) When drinking or if eating no convulsive movements of head, neck or chest.	(4) On making an effort at swallowing when first stage is well developed may have convulsive movements of head with projection of neck.
(5) Lies on side during acute vomiting stage.	(5) No vomiting stage, no special position.
(6) Slight dyspnoea after vomiting and ease when paralysis has reached chest.	(6) Dyspnoea.
(7) Looseness of bowels during most of course, principally at first. After paralysis is complete an incontinence occurs.	(7) No special change in bowel movements at first, probable tendency to constipation, later paralysis of bowel.
(8) At height vomiting continues. Green fluid not associated with efforts to swallow. No hydrophobia.	(8) Vomiting associated with efforts to swallow. No hydrophobia.
(9) Takes water frequently and easily until complete paralysis occurs.	(9) Avoids water because it induces vomiting or maniacal attacks, or inability to swallow. At first takes water frequently.
(10) Paralysis appears about five hours after dose of two grains. Appears always in this order, hind extremities, fore extremities, body, neck, head and face. Time of pharynx palsy impossible to determine.	(10) Paralysis appears in one to four days in paralytic type first in pharynx, proceeds to jaw, tongue, eyes, face, hind quarters, body, forequarters in this order usually.
(11) Pulse slow, down to 70, large broad and high tension, rapid and thready at very end.	(11) Pulse rapid, may reach 200 (?) tense high pointed.
(12) Temperature high during middle of course, low at end.	(12) Temperature high during middle of course, low at end.
(13) Abdomen begins to swell two to three hours before death, paralysis of intestines.	(13) Abdomen sometimes swells.
(14) During course animal will net eat.	(14) Animal tries to eat until maniacal outbreaks cause him to fear swallowing.
(15) No convulsive movements at any time. No sudden running, snapping or biting into air, no aggressive attacks on attendants.	(15) Convulsive movements when trying to eat when disturbed in the early stages, snapping and biting into air. Aggressive if not paralyzed.

(16) No attempt to run away, prefers to be quiet.	(16) Attempts to run away in excited stage.
(17) Pupils contract in early stage, dilated when paralysis occurs.	(17) Pupils dilated.
(18) No characteristic howl.	(18) Characteristic howl.
(19) Albumen but no sugar in urine.	(19) Albumen and sugar in urine.
(20) Death by respiratory paralysis.	(20) Death by respiratory paralysis or asthenia.
(21) Course ten to twenty-four hours.	(21) Four to ten days.
(22) Sections of brain contain no Negri bodies.	(22) Sections of brain contain Negri bodies.
Injection of emulsions of nerve tissue into rabbits cause no symptoms.	Injections of emulsions of nerve tissue cause experimental rabies in rabbits.

The foregoing descriptions and the differential diagnosis which we have outlined just above give us a good working basis for a decision in a given case. The pictures are essentially different, but since it is not always easy to make a quick diagnosis of any conditions, there exists all the more reason why we should be guarded in our statements about this disease, rabies, which has such frightful results. The similarities as well as the differences make it imperative that a suspected case should be observed throughout the whole course of the symptoms, so that an innocent condition should not be held responsible for profound nervous strain in individuals or families and the institution of Pastuer treatment. As a second consideration valuable dogs may be saved.

In closing let us again urge the necessity of allowing the symptoms to advance by permitting the animal to live, thus giving play to all the nervous phenomena peculiar to rabies.

DIXON and FOX.

Pennsylvania
Health Bulletin

No. 3. HARRISBURG, PA. SEPTEMBER, 1909

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

WITHDRAWN

THE FAMILY PHYSICIAN

An Address delivered at the opening of the Second Annual Conference of County Medical Inspectors and Physicians in charge of the State of Pennsylvania's Tuberculosis Dispensaries, held in Philadelphia, October 4 and 5, 1909.

BY SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER OF HEALTH OF PENNSYLVANIA.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1909

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 3. HARRISBURG, PA. September, 1909.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

THE FAMILY PHYSICIAN.

An Address delivered at the opening of the Second Annual Conference of County Medical Inspectors and Physicians in charge of the State of Pennsylvania's Tuberculosis Dispensaries, held in Philadelphia, October 4 and 5, 1909.

By SAMUEL G. DIXON, M. D., LL.D., Commissioner of Health of Pennsylvania.

In the literature of a century ago three figures stood out prominently from the general background in all efforts to depict American life. While this was especially true of the smaller towns and country villages, yet it also held good for the cities in a modified degree.

These figures were the minister, the judge and the doctor. They were the types in the minds of the people of all that was respectable, cultured, refined and worthy of honor. By education and by professional attainment and association they belonged to a class by themselves, so distinct indeed that in New England the great medical humorist, Oliver Wendell Holmes, designated it the Brahmin Caste. Of these three worthies the minister commanded, to the highest degree probably, the reverential respect of the community; the judge was held in the greatest awe and his opinion was more constantly sought in political and civic matters; but the physician held the affections of the people and on the whole was probably more of a controlling factor in shaping public opinion and in the dissemination of knowledge on familiar subjects than either of the others.

Speaking as one having authority on medical matters, it is easy to understand how he became an authority on all subjects of a scientific nature and so was looked upon as a sort of walking encyclopaedia, to be trusted as the ultimate reference on all subjects save those of religion and the law, which had their own special exponents. The intimate friend and confidant of his patients, he became familiar with family histories and troubles and was constantly appealed to for advice in the solution of domestic difficulties. His presence during circumstances of stress, anxiety and affliction brought him very near to their hearts so that even the minister was scarcely bound to them by closer ties. Under his watchful supervision families grew up, came to maturity and in their turn established families of their own, so that he became a traditional element in the family life to share in every rejoicing and to be appealed to in every emergency, medical or otherwise. The power for good which he thus wielded in his neighborhood cannot be overestimated, and the use which he made of it, as a general rule, contributed largely to making his profession honored and respected.

Two of these figures still occupy to a good degree the niches to which former generations assigned them. The clerical and the judicial representatives are yet looked up to for instruction and guidance and continue to be leaders of the people. But can we with clear conscience make the same claim for our own profession? Has not the physician measurably stepped down from his pedestal and ceased to be the controlling factor in the affairs of the community as well as in its domestic life that he once was? And has he not, to a considerable extent, himself to thank for this change in the attitude of the public? Instead of making the esteem, affection and confidence of his families and the community his chief goal, has not his thoroughly laudable ambition to build up a reputation for a high degree of technical knowledge led him to neglect the psychological treatment so essential in the practice of medicine even in this day when medicine is almost entitled to be called an exact science? And incidentally is not this neglect opening the door for laymen to step in and usurp his prerogatives? Has it not led him to slight the opportunities which constantly present themselves of sharing with patients the training of their children so that they may become more perfect types of humanity?

Moreover it will not do to disregard the suggestions of the medical instinct. We must take into account the *feeling of the picture* presented by our patient. We may assert with mathematical accuracy that the patient presents a heart murmur of a certain definite character or that the excretions contain specific bodies which we recognize as pathological or that there are typical rales in the lungs, but all these do not enable us to arrive at an accurate prognosis unless we accustom ourselves to recognize all the conditions taken collectively which form to the experienced bed-side practitioner the *feeling* of the case. The artist will tell you that a picture at which you are gazing is a failure, that it cannot possibly live before the criticism of the world. He may admit that it is well drawn, that the perspective is correct, and the grouping good, that it has color and atmosphere but after all it lacks the true feeling which the public demands to satisfy its sense of the beautiful . The physical and mental conditions of your patient combine to produce this intangible feeling of the case, and in order to be able to recognize this, the most skillful practitioner must be willing to spend his time with his patient and consider his history and antecedents and carefully study his environment.

I fear, fellow students, that we are narrowing down too much to abstract technicalities, that, for example, we are losing sight of the fact that digestion in the test tube is not performed under the modifying and stimulating influence of life which is as yet an unknown quantity. I once travelled to the State of Georgia simply to witness a most vigorous azalea growing out of a formation of pure silicate. Science cannot explain the life power that enabled that plant to draw abundant nourishment from silica, the atmosphere and sunshine. Neither can the physiologist explain just how man at times will develop and be supported on beechnuts and water. And, in regard to treating your tuberculosis patients, let me suggest just in this connection, that you must note the idiosyncracies of your individual cases and remember that yet unknown power of the digestive function under the influence of life. Study each case separately. meet its individuality and do not rest satisfied until you see evidences that you are nourishing it. If one class of food fails try another. The medical man who declares that if milk and eggs fail to build up a tuberculosis patient, no other food will, is not to be trusted with the care of those suffering from that malady.

That you may appreciate how strong my faith is in the value of nitrogenous food stuffs in combatting this disease I take the liberty of referring you to my communication to The Academy of Natural Sciences, of Philadelphia, on the "Possible Relationship between the Tubercular Diathesis and Nitrogenous Metabolism," copies of which I have caused to be distributed, a statement let me say, which, although uttered fifteen years ago, I see no reason to alter.

Just before I jumped the track of my theme I believe I suggested that we are "narrowing down" too much. Enlarging upon this thought I will venture to sketch, possibly a little extremely, the daily life of a most modern and truly great medical man in one of our large cities.

His early office hours over, interrupted as they have been by telephone calls, questions from several assistants, and side door momentary consultations, he rushes to his automobile, and is whirled at top speed to the house of one of his wealthy clients, summoned, we will say, on account of the acute illness of the mother of the family. He hastens up stairs to the bedside of the sufferer. His experienced eye and touch at once furnish him the facts on which to base a diagnosis with dispatch and accuracy. He leaves a prescription suited with almost mathematical accuracy to the needs of the case (he sees a score of such in the course of a morning) promises to call to-morrow, flies down stairs and out at the front door, quite ignoring other members of the family, putting on his hat as he descends the door steps, having spent three minutes and thirty seconds on the call, jumps into his panting auto' and dashes off to the next case and so on through the entire day's work. In the course of it he attends two or three consultations, gives his opinion with clearness, sagacity and conciseness and is off again. Incidentally he stops at the medical college of which he is a bright and shining light and delivers a brilliant lecture on "The Etiquette of the Sick Room." At the close of the day he hands over his crowded visiting list to his clerk and feels well satisfied with his day's work. And well he may! As a diagnostician and prescriber, pure and simple, he has done his duty faithfully. He has prescribed judiciously and as the event will probably prove with excellent results, he has done nothing to mar his bright prospects and has maintained his standing as a profound thinker and brilliant practitioner among his fellows. After dinner, if he has time for it, he is off again to his medical society where he reads a paper on "The Medical Worthies of the Last Century," which is received with applause, and then finishes his day by joining his family in their box at the opera, in the hope of resting his weary brain.

But what has he accomplished toward establishing kindly relations with the father and children of his families and becoming an integral part of the family life. Has he not been little more than a diagnosticating and prescribing machine doing his work with mechanical precision, but leaving no more trace of his personality than would a perfect piece of mechanism?

In order that the physician may wield the influence that he did of old and regain his place of authority in the community I would suggest in contrast to the last picture the possible day's work of one who might be a happy medium between the worthy of the by-gone centuries whom our friend so delightfully recalled in his lecture, who practiced the *art* of medicine, and the modern man who practices the *science* as well as the art. During his office hours he would give each patient his sole and individual attention. Of course he would have lost no time in answering the call to the sick mother. Knowing the father intimately he would have had a friendly word with him, a promise to see him again and let him know the character of his wife's indisposition. He would make a mental note of the condition of the children as he passed them with a friendly smile. He would have taken his seat quietly by the patient's bedside and would have studied her case in a comprehensive way, allowing her to tell her story and so getting side lights on possible complications of which the present attack was but a manifestation. His prescription for the immediate illness would be accompanied by advice calculated to prevent a recurrence of the attack and the visit would have left a sense of confidence and repose in the mind of the sufferer such as a whirlwind entrance and exit would never give.

Leaving the sick room he would voluntarily seek the head of the house, would have relieved his anxiety as to his wife's illness and given him such hints as occurred to him as to his own conduct in the care of her health. He would inquire with regard to the health and constitutions of the children and, if there were indications of lack of vigor or faulty development in any one of them, he would cause such child to be brought to him and subject it to a careful examination. As a result of this precaution a commencing curvature of the spine may have been detected, or a malformation of the chest, which, neglected, would furnish conditions to invite tuberculosis. At the next house the sanitary conditions in and about the home would come in for an inspection. and some covert source of disease, such as a neglected or a hidden drain, might be discovered, which would throw light on many inexplicable illnesses in the house.

Of course all these subjects would not be discussed at one visit, but it would be the habit of mind of the physician to be on the alert for the discovery of any conditions that might influence the health of the inmates unfavorably. In other words he would not consider that his responsibility ended in prescribing a pill or a potion in an individual case of sickness but would constitute himself the jealous guardian of the health of the entire family.

As opportunity offered he would enlighten the older members of the family as to questions of personal hygiene and even call their attention to the requirements of public hygiene. He would insist on the vaccination of every child born into the family and make the parents appreciate the importance of this measure both as a protection to its own life and as a duty owed to the community.

Parents who had the advantage of such instruction would be extremely cautious about allowing their children to be exposed to those suffering from measles, whooping cough or other so-called children's diseases, knowing what terrible sequelae may result even from cases which in themselves appear trifling, and they would be as careful not to permit their own children to convey these diseases to others, as to protect them from infection. The diet of the children of such families would be plain, substantial and nourishing, fitted to lay a foundation of vigorous health which would render them immune to the germs of tuberculosis to which they must at some time be exposed, and if any child exhibited any of the well known indications of a strumous tendency, especial attention would be given to the diet of such child.

He would take an interest in the education of the children of his families. If any of them showed special morbid tendencies he would give such advice as would result in overcoming these. Children with narrow chests or tendency to spinal curvatures would be put in the way of taking appropriate exercises and encouraged to spend much time in the open air. Those who showed a predisposition to pulmonary affections would be placed at school in locations affording the best climatic conditions. Those evincing cardiac weakness would be guarded against excessive exercise and the exaggerated athletics of the day. Those who showed unusual mental precocity combined with nervous excitability and defective muscular development would be warned against undue mental strain and their parents would be led to appreciate the advantages to be derived from interrupting their schooling and allowing them to lead an unrestrained outdoor life for a time.

The confidence placed in him as a doctor in physical disorders could easily be brought to bear also on moral conditions, especially in the training of the boys of the family. Growing youth who will resent the preachments of a clergyman will gladly listen to advice from a physician whom they have grown up to respect and trust. In these ways and many others which have occurred to you, such a physician would do more than any other individual in the community toward establishing a noble American type of humanity.

The pedestal is still there, but too often it stands empty and abandoned. Why should not we, any one of us, in our respective communities, essay to fill it?

The continued advance of our beloved State in the sciences, the fine arts and the mechanic arts must depend to an immense extent on the cultivation of preventive and corrective medicine. When we fully realize the fact that upon us depends the perfection of our people, we shall rise to the full measure of our responsibilities, not resting until we have seen to it that the children of our families are placed in a proper environment to permit and encourage the development of a grand race of men and women. And when the parents realize that we are taking a deep and real interest in maintaining the health of those so dear to them and instructing them how to avoid disease by all the methods that science can suggest, then the medical man will command the respect of the community to so high a degree that he will again wield the influence in our great Commonwealth that his high profession entitles him to.

At present the people do not come into sufficiently intimate relation with him to understand the human side of his character and to realize the sacrifices which he is daily making for their good. The association is too mechanical so to speak. The physician and patient seem to me to have been drifting farther and farther apart. To this we must attribute the fact that he no longer possesses the influence in governmental affairs that he once did and properly should. To recover this it is essential that we should awaken to the great strides which preventive medicine has been making and cause our knowledge of this branch of medical science to be felt in each household we enter and each community in which we live.

Another thought. We, as a rule, probably do not sufficiently realize the fact that, in accepting a diploma from a chartered medical college and a license to practice from a state medical examining board, in return for certain exclusive prerogatives conferred upon us, which are variously described in the language of the diploma as rights, honors and privileges, we are incurring equivalent obligations. The transaction is not all one-sided. We owe something to the government in return.

To a certain extent we become state officials. The practice of our profession puts us in almost exclusive possession of knowledge of the most important kind, knowledge essential to the transactions of the affairs of the state and intimately associated with the maintenance of the public health. It is due to the state and the public that we should furnish this knowledge gratuitiously at such times and in such ways as the state deems necessary.

We are in possession of knowledge as to the causation of disease as well as its treatment, and it is our duty in our intercourse with our patients not only to treat individual cases of disease but to take the occasion thus offered as an opportunity for giving instruction such as will tend to prevent the recurrence or spread of this and similar diseases.

Especially in our own state has the government put our profession under unusual obligations by the generous manner in which it has provided its instructions of medical learning with opportunities for clinical instruction, by responding to our representations in the establishment of a department of health with plenary powers, under medical supervision, and by providing that department with funds to carry on its great work to an extent unexampled in the history of states.

In your official capacity, gentlemen, in connection with the Commonwealth's Department of Health you are the guardians of the health of the people of your respective counties. It is your business and privilege to keep a constant eye to the conditions which may contribute either to improve or to undermine their health. In order to accomplish this it is your duty to acquaint yourselves with the general state of health of your communities and especially with that of the portion still in the comparatively helpless condition of childhood.

You should make yourselves familiar with their habitations and modes of life, the ventilation of their bed rooms, the drainage of their houses and grounds, the water they drink, the food they eat and the clothing they wear. In order to be able to do this easily and without undue wear and tear, you should already have accustomed yourselves to it in your daily life as family physicians, which most of you fortunately are. And just in proportion as you have schooled yourselves to attain to the high ideal of the old time family doctor, as the guardians of the health of your families, father, mother and children, the friend and counsellor of the heads, the beloved adviser of the younger members of the household, will you be able to successfully fill your places as the protector of the health of your several counties.

You should study the vital statistics of the different sections of your county, especially as found in the annual reports of the Department, and thus discover where local sources of disease are lurking. As you traverse your territory in your daily practice as well as in making your occasional inspections, travelling over the roads at all seasons and all hours, you will have opportunities of observing dangerous grades, unsafe bridges, defective drainage, faulty railroad crossings and other dangers to life and limb, and you will call the attention of supervisors or other proper authorities to such conditions and urge their improvement. Obstructions to water sources, old abandoned canals, neglected mill dams and other collections of stagnant water, as well as wet and marshy lands, will claim your especial attention.

A medical officer of health in Ohio in a recent paper pertinently calls attention to the fact that the condition of country districts is rapidly approaching that of villages and the suburbs of cities. It is not an uncommon sight to see farm residences with their barns and outbuildings occupying the space along country roads almost as closely as village or even city streets, and, though there may be broad acres behind them, the danger of water pollution and the chances of communication of diseases in other ways are equally great as in more crowded centres of population. In some ways, as he well says, the dangers are even greater in the country, as, for instance, in the breeding of flies from manure heaps, and mosquitoes from stagnant pools, rain barrels, obstructed ditches and the like. The experience of England in the banishment of malaria and kindred disease by the drainage of swamps and fens has been repeated in Ohio as well as in our state. "Up in our county," he says, "a generation ago the land was wet and swampy, with poor crops on sour land, to say nothing of the discomfort of mosquitoes and other insects and every form of disease that infects swampy districts." Sanitary cranks at last appeared who proposed to cut great ditches miles long to drain the marshy lands. The labor was great and the expense was great and the wails and protests of the taxpayers that went up were even greater. But the ditches were dug nothwithstanding and the land began to yield. Want was succeeded by plenty, and malarial and kindred diseases became things of the past Just such opportunities are awaiting each of you to become the pioneers in some great work of public sanitation.

The condition of the schools should demand your attention. As you will see by the reports of our health officers on this subject they are by no means up to the standard of modern sanitary science and the requirements of our legislators. What can be expected from a school where the closets are of the old unsanitary type, nothing more than open privies, with all their attendant stenches, open to both sexes alike, and kept in a condition of disgusting filth, or where the source of light subjects the pupil's eyes to a constant glare.

The medical supervision of schools is a subject which merits your careful study and earnest efforts in promotion. With such superintendence, contagious and infectious diseases would often be nipped in the bud, before opportunity was given for their spread through the community.

The dangers of the common drinking cup and the promiscuous towel and of the lack of personal cleanliness generally need only to be faithfully impressed by the school physician and the school nurse to have them become things of the past.

Quite apart from your general responsibilities however as guardian of the health of the people is the special responsibility which has been devolved upon you by the State in your appointment as physicians in charge of the tuberculosis dispensaries.

I need not urge upon you the importance which must daily impress itself upon you of making yourselves as proficient as possible in the diagnosis of this disease in its earliest stage. The sanatoria and infirmaries which the state has established and is establishing for the cure of pulmonary consumpton depend entirely upon you for sifting out the applicants so that the greatest good may be accomplished by the restoration of incipient cases to health and usefulness, and by the segregate care of those in the later stages for whom only alleviation is possible. The clinics which have been arranged for this occasion will greatly assist you in this important study and I am assured that you will avail yourselves of the opportunity to the fullest extent.

To meet you thus personally is to me a matter of very great pleasure and I feel that you must share with me the pride which I cannot conceal in being intimately associated with so representative a body of professional men, filled with the enthusiasm of humanity and burning with an earnest desire to do the best that in them lies for the welfare of their fellowmen.

Pennsylvania Health Bulletin

No. 4. HARRISBURG, PA. OCTOBER, 1909

PUBLISHED MONTHLY

THE STATE DEPARTMENT OF HEALTH

SAMUEL G. DIXON, M. D., LL. D.

COMMISSIONER.

WITHDRAWN

LEGAL RIGHTS AND TUBERCULOSIS

BY SAMUEL G. DIXON, M. D., LL. D.,

Read Before the Seventh International Tuberculosis Conference at Philadelphia, September 25, 1908.

THE PUBLIC DRINKING CUP.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1909

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 4. HARRISBURG, PA. October, 1909.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Legal Rights and Tuberculosis

By SAMUEL G. DIXON, M. D., LL.D.,

Read Before the Seventh International Tuberculosis Conference at Philadelphia, September 25, 1908.

While the wording of the topic allotted to me seems more or less obscure, I presume that the consideration of the subject properly involves the discussion of how far necessary measures for the suppression of tuberculosis may be adopted by the State, consistently with the rights of the individual and the rights of property, and what measures are, in fact, necessary to that end.

Health laws and regulations are enacted and enforced in the exercise of the police power, a power which is inherent in every sovereignty.

"This police power of the State," says Chief Justice Redfield in Thorpe v. Rutland & Burlington Railroad Company, 27 Vermont, 140, "extends to the protection of the lives, limbs, health, comfort and quiet of all persons and the protection of all property within the State."

In the case of Jackson v. Massachusetts, 197, U. S., 11, which was one involving the right of the board of health of a city to compel the vaccination of all persons over the age of twenty-one, the court, speaking of the police power, says:

"The authority of the State to enact this statute is to be referred to what is commonly called the police power—a power which the State does not surrender when becoming a member of the Union under the Constitution. Although this court has refrained from any attempt to define the limits of that power, yet it has distinctly recognized the authority of a state to enact quarantine laws, and 'health laws of every description,' * * * * according to settled principles the police power of a state must be held to embrace at least such reasonable regulations established directly by legislative enactment as will protect the public health and the public safety."

In the exercise of the police power the State may quarantine persons suffering from or exposed to infectious and contagious diseases, compel the abatement of all nuisances detrimental to the public health, or abate them itself, even going so far as to destroy property without compensation to the owner, when necessary. In fact, there seems to be no limit to the exercise of the police power for the protection of the public health, so long as it is exercised in good faith.

Wherever cases have arisen in the courts involving the exercise of the police power for the protection of the public health, the question raised is usually not whether the State has the power to impose a certain regulation, but whether it has in fact actually exercised it. Health regulations are usually entrusted for their enforcement to local boards of health, and questions frequently arise as to whether or not such a board has exceeded its powers in a given case. Thus, the right of such a board to declare something a nuisance and abate it, which is not *per se* a nuisance, has been frequently questioned. But, as above stated, whenever the legislative intent to impose a health regulation is clearly expressed, the power to impose the same is undoubted.

Corporations are subject to health regulations as fully as individuals it having been held in numerous cases that the rights and privileges vested in corporations by their charters "are placed upon the same footing with other legal rights and franchises of the citizens and subject in like manner to proper rules for their due regulation, protection and enjoyment." Cooley's Constitutional Limitations, p. 836.

But while the power of the State to enact health regulations is ample the enforcement of the same is often extremely difficult. In Europe where the citizens have been long accustomed to a minute regulation of their affairs by the State this difficulty will, naturally, not be encountered to the degree that it is in the United States, where the citizens are impatient of a too arbitrary governmental control of their persons and property. As civilization becomes more complex, new duties arise, and it becomes more and more difficult for the citizen to act without encroaching on the rights of others, and hence new laws and regulations become necessary. This is apparent to the intelligent, but by a large portion of the community such new regulations are regarded with disfavor.

This being the case, health regulations should always be capable of being enforced in a summary manner. The process of indictment for violations of the same is too slow and cumbersome, and sometimes ineffective, since, owing to the local opposition to the enforcement of a given regulation, grand juries will frequently refuse to indict and petit juries will not convict. Health regulations should therefore, be enforced *by summary proceedings before a magistrate, and* these should *not be required to be brought before one of the immediate vicinage,* but should be capable of being brought before any magistrate in the county.

The difficulty in enforcing health regulations being as stated, it follows, first that the laws should be specific in their requirements, so that there may be no doubt as to the legislative will, and no question arise as to whether the health officers are exceeding their powers in given cases, and, second, that such regulations should be as little vexatious as may be, and, where new ones are adopted, they should be, if possible, preceded by a campaign of education, so that the community may be led to see the necessity therefor, and thus willingly acquiesce in their enforcement.

It is probable that regulations to prevent the spread of tuberculosis will prove to be more difficult to enforce than those relating to other infectious and contagious diseases. The spread of smallpox, scarlet fever and some other infectious and contagious diseases can be observed by anyone. The effects of such diseases are patent, and when the diseases are epidemic they strike the citizens with terror, which conduces to a popular acquiescence in the enforcement of measures for their eradication. But tuberculosis is an insidious disease which is always with us. It strikes down its isolated victims here and there in such a manner that its communication cannot be readily noted. Until recently it was not believed to be infectious.

This being the case, the authorities should give the widest publicity possible to the facts in regard to tuberculosis and the necessity for the enforcement of regulations to prevent its spread, and such regulations should be made more and more stringent as the public become more and more educated to see the necessity therefor.

The universal method of preventing the spread of other infectious and contagious diseases in all civilized countries is to isolate or quarantine the source of infection, that is, the persons suffering from such diseases, and there seems to be no abstract reason why the same practice should not be followed in the case of tuberculosis. The power of the State is as ample in the one case as in the other, but such a method in the case of persons suffering from tuberculosis is not expedient at the present time, for numerous reasons, in addition to the fact that popular sentiment has not been sufficiently educated to approve of the general enforcement of this measure.

It being inexpedient, then, to isolate all persons suffering from tuberculosis the question arises what other measures should be resorted to to prevent the spread of the disease.

This brings us to consider the legal rights of the people as, not opposed to but contrasted with those of the individual.

The legal rights of the people under our republican form of government may be comprised in the single word protection. Protection to life, protection to health, protection to property.

By an unfortunate twist in the mental conception of our people, however, those objects which should take the first place, life and health, have too often been relegated to the last, while property is made the first consideration, so that throughout the United States there are a hundred laws for the protection of property to one for the protection of life and health. It should be our first business as sanitarians to correct this mental obliquity of vision and enable the public to see things in their correct relations.

The first legal right of the people so far as the prevalence of tuberculosis is concerned is the right to know through the Government, which is simply their agent, exactly where the organisms which are responsible for the spread of the disease exist. This knowledge can only be furnished by requiring the medical attendants of all persons suffering from the disease to report to the health authorities, who represent the people for this purpose, the names and addresses of all such patients as soon as the diagnosis shall have been established. Without such definite and trustworthy information those who are placed in charge of the lives and health of the people are helpless.

This duty may be lawfully imposed upon such attendants without compensation. State vs. Worden, 56 Conn., 216; Robinson vs. Hamilton, 60 Iowa, 134. See Johnson vs. District of Columbia, 27 App. D. C., 259.

In the second place it is the right of the people to know when, where and by whom their dead, of whatever disease, are buried. In order to secure this knowledge, all undertakers, funeral directors or other persons in charge of funerals must be, and in Pennsylvania are, forbidden to bury a dead body except upon obtaining a permit granted by an officer of the local government issued upon the certificate of the physician in charge, and giving the following data: Name of the deceased, occupation, sex, color, age, social condition, cause (name of disease) and date of death. In this way alone can a permanent record be obtained of the deaths from tuberculosis. This is essential to provide the authorities information as to places where the disease is especially prevalent and where their services in disinfection are needed. The power of the government so to provide is ample. Myers vs. Daddenhauser 93, S. W. R. 43.

Thirdly, with the same objects in view it is the right of the people to require that transportation companies shall be forbidden to carry the body of one dying of tuberculosis without a written permit from the authorities.

Let me explain that there are many legal rights of the people which are not in this country directly statutory but which are maintained and enforced by health authorities to which the right to make and enforce rules and regulations declared to have the force of laws or ordinances has been legally accorded. There are also certain rights definitely determined either by statute or regulation in many countries and not adopted as yet in this country, about which there is no question in the minds of sanitarians, and which must inevitably become legal at no distant date if we are to succeed in this contest. I shall therefore in referring to these make no further reference to enactments or judicial decisions.

Fourthly, it is the right of persons desiring to change their residence to receive from the landlord or owner of the dwelling which they wish to rent or purchase a clean bill of health from a health officer.

In like manner the travelling public have a right to be assured that rooms in hotels or boarding houses which they occupy have either not been exposed to the tubercular infection or have been thoroughly disinfected since such exposure, and that all dishes and eating utensils which have been used by those known to be tuberculous have been sterilized.

Fifthly, it is the right of those making use of public laundries to have the assurance that all clothing and bed clothing used by tuberculous patients and sent to be washed first be sterilized so that infection may not be conveyed to the clothing of others.

Sixthly, it is the right of persons occupied in, or visiting, public buildings to feel secure against infection from sputum, and it is therefore the duty of the authorities or owners to provide the janitors or caretakers of such buildings with an adequate supply of cuspidors and instruct them to keep a liquid disinfectant in the same. Similarly it is the right of all employees of either sex in mills, factories, or work shops of whatever kind to be protected by a like provision. It is further the right of those visiting places of public amusement or worship, courts of justice or other places of assemblage to be assured of such an abundant supply of pure air as shall diminish as far as possible the danger from the inhalation of tuberculous germs, and all persons working in factories where much dust is thrown off should be protected by such mechanical contrivances as may reasonably remove the dust from the general air of the rooms.

Seventhly, it is the right of those who travel by night to be provided with clean bedding. To insure this all transportation companies should be compelled to have all washable bed clothing disinfected and washed after each occasion of use. All blankets whether of wool or cotton must be covered with washable material so completely that they shall not touch the face, while blankets and bedding must be disinfected at least as often as once a month.

All bedding and blankets in hotels and transient boarding houses should be similarly treated. Transportation companies should likewise be required to provide an adequate number of receptacles for sputum. They should forbid their employees from brushing the clothing of passengers except in a portion of the car provided for the purpose away from the presence of other passengers. Should the passenger refuse to remove to the designated place, the porter should be authorized to decline to render him this service.

All vehicles for the transportation of passengers by land or water must be properly ventilated and never allowed to be overcrowded, by which I mean crowded to such an extent as to require so rapid a movement of air for purposes of respiration as shall endanger the health of passengers in various ways.

All transportation companies should be required to place conspicuous notices in or upon all their stations, coaches, wharves and vessels, forbidding spitting except in receptacles expressly provided for the same furnished in accordance with law.

With the same object in view the people have a right to clean sidewalks uncontaminated by tubercle bacilli which may be carried into the houses on shoes or clothing and all municipal authorities should be required to pass ordinances forbidding spitting on sidewalks or other public places and to post conspicuous notices warning persons against the commission of this act under adequate penalty.

Eighthly, the people have a right to demand pure food, free from all infection. To this end all purveyors of food should be compelled to refuse to employ or to discharge any employee, whose duty it may be to handle food products, who may be found to be suffering from tuberculosis. Vendors should be forbidden to receive any vessels which have contained food, such for instance as milk, from houses where consumption is known to prevail until the same shall have been disinfected.

The people have a right to pure uncontaminated milk, especially in view of the fact that young children so often develop tuberculosis and that the opinion is strongly gaining ground that the cause of such development is to be found in the cow's milk with which they have been fed. Hence milk vendors should be forbidden to purvey milk from cows proven to be tuberculous. Such animals should not be permitted to live, but, in order to prevent the financial ruin of their unfortunate owners, the government should reimburse them a reasonable percentage of their value. All food products exposed for sale should be screened from flies and other insects, and all owners of stables should be compelled to screen their manure pits from flies, inasmuch as these places are known to be the common breeding places for these insects, which are equally well known to be transmitters of disease germs on their feet and wings. Public officials should constantly supervise the sale of food stuffs in order to insure their purity in these respects. This is a point of the greatest importance as an abundance of wholesome pure nourishing food is essential to those who have a predisposition to pulmonary disease to enable them to resist the invasion of the tubercle bacillus.

The people also have the right to demand pure water which is not less important as a prophylactic than pure food. It is not generally known that the tubercle bacillus may be found in waters containing sewage from public institutions. This fact has been demonstrated in our Department laboratories during the past year. Hence no tuberculous matter should be permitted to enter streams in sewage from hospitals, alms houses, laboratories or dwellings without thorough disinfection. All sufferers from tuberculosis owe it to their fellow citizens that they should carry sputum cups and on no account deposit sputum elsewhere and this should be a matter of legal requirement. They should also provide themselves with individual drinking cups in order to avoid those used by others.

Persons who are compelled to reside temporarily or permanently in public institutions such as hospitals, asylums, homes, alms houses or prisons, have a right to be protected from the dangers arising from association with other inmates who may be so unfortunate as to be tuberculous.

Hence those in charge of such institutions should be compelled by law to segregate their tuberculous patients or inmates.

It is the right of parents to feel secure from the communication of tuberculosis to their children when attending school. Tuberculous children should therefore be forbidden from attending school and no tuberculous person should be engaged as a teacher or be allowed to continue in that capacity.

Inasmuch as it is well known that measles and whooping cough predispose children who have suffered from them to tuberculosis to a serious extent, strict laws should require the quarantine and isolation of those affected in order that their unnecessary prevalence may be restricted. Ninthly, the people have a right to demand that clothing offered to them for sale as new should be clean and free from all contagion. Hence the law must provide that all garments upon which tuberculous persons have worked shall be disinfected before being placed on sale.

Tenthly, the people have a right to demand stricter limitations on the sale of alcoholic beverages, such as would prevent their use to excess, since their abuse is well recognized as a direct factor in re ducing the resistance of the system to tuberculosis, quite apart from the poverty which it engenders, which is an indirect factor.

In the eleventh place, public utilities, such as telephones, drinking cups, pencils and pen holders should be cleaned and disinfected daily.

Two thoughts in conclusion. I have laid stress in this brief paper on the right of every citizen to pure food, pure water and pure air for the reason that in this fight to the finish against this great enemy of man I believe two points of attack are open, neither of which must be neglected. The first is obviously the tubercle bacillus itself. The second, less obvious perhaps but not less important, is the loss of resistance on the part of the system to the invasion of the bacillus, and this can only be met by building up the resisting powers of the individual by every means at our command.

THE PUBLIC DRINKING CUP.

We read with horror the story of the poisoners of the Middle Ages and the crimes of the Borgias. We shudder when we think of the days when the preparation of deadly potions with murderous intent was a profession, and the goblet proffered under the guise of courtesy was too often the instrument of death.

But let us not forget that conditions often exist in which carelessness is as death-dealing in its results, if not as culpable, as criminality.

The exact scientific knowledge of today, made common property by the ready agency of the public press, imposes new responsibilities. There is scarcely a person so ignorant as not to be aware that consumption is caused by a germ or bacillus, that that bacillus lurks in the mouth and on the lip of the consumptive and thence may be, and constantly is, communicated to any vessel that the consumptive puts to his lips. The same is true of diphtheria and other infectious diseases.

This being the case, the cup that is used in common in public places must inevitably be the constant medium of communication of such affections, and as truly a poisoned cup as though it contained arsenic or strychnine, all the more dangerous because neither to sight, taste nor smell is a hint conveyed of the presence of the poison, and because it gives no immediate indication of the injury it has inflicted.

Such cups are to be found, first of all, in the schoolroom, especially in the country schoolhouse, where the old slimy bucket stands with the equally slimy tin cup by its side, the ready dispenser of multitudinous germs. Not infrequently it lies at the bottom of the pail, so that grimy hands must be thrust into the water in order to reach it.

Next in order of fatal possibilities probably comes the glass in the railroad car, out of which high and low, rich and poor, of all ages, quench their thirst. The following picture from actual life can be duplicated with variations on almost every train:

The father of a family well gone in consumption, after a fit of coughing and its necessary result, hastens to cool his burning throat, his sweeping moustache spreading well over the sides of the glass and into the water. The glass, with no pretense of cleansing, is gallantly brought back to the wife with the innocent baby in her arms, both of whom partake, and then the other children, seized with imitative thirst, each travels to the cooler and slowly guzzles the cooling fluid.

What opportunities are there here for the addition of a whole family to the roll of the victims of inherited tuberculosis! And what of the other passengers in the car!

And then the public drinking fountain, what promiscuous drinking does it witness! Placed there by kindly hands, emulous of the praise bestowed upon him who gives a cup of cold water in the name of a disciple, how many has it tempted to premature death! In each instance the hand that holds out the cup is extended in the kindliest spirit, in obedience to a generous impulse, but thoughtless of consequences.

But, it may be said, people must drink. How is this danger to be avoided? The problem is not a difficult one. Let each child carry its own little cup with it to school.

Let the traveler carry a collapsible cup in his pocket, and let the street fountain be made with an upturned faucet, so that the water, gently bubbling upward, may be drawn in by the thirsty lips without contact with aught else.

Pennsylvania

Health Bulletin

No. 5. HARRISBURG, PA. NOVEMBER, 1909

PUBLISHED MONTHLY BY

THE STATE DEPARTMENT OF HEALTH

SAMUEL G. DIXON, M. D., LL. D.

COMMISSIONER.

MAR 22 1910

WITHDRAWN

THE GERMICIDAL EFFECT OF WATER FROM COAL MINES AND TANNERY WHEELS UPON BACILLUS TYPHOSUS, BACILLUS COLI, AND BACILLUS ANTHRACIS.

DEPARTMENT OF HEALTH LABORATORIES.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 5. HARRISBURG, PA. NOVEMBER, 1909.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, Bacillus Coli and Bacillus Anthracis.

Laboratories of Department of Health.

At the headwaters of several of the main tributaries of the large river basins in Pennsylvania may be found extensive coal operations either in the anthracite or the bituminous fields; notably in Carbon county, in the Lehigh River basin; in Schuylkill county, in the upper Schuylkill River basin; in the Lackawanna and Luzerne districts of the Susquehanna River basin, North Branch; in the bituminous fields in the Allegheny Mountains of the Susquehanna River, West Branch; in Dauphin county on the lower Susquehanna basin; also in the lower Monongahela basin; and the lower Allegheny River basin. It so happens that on the main streams, below these extensive coal fields, have been built the cities in which reside a large percentage of the entire population of the Commonwealth. The sources of supply to the public in these places are without exception the rivers at their doors. It has been observed that these waters are remarkably free, comparatively speaking, from bacterial life, although the streams are used as repositories for sewage by the settlements strung along their banks, even up to the summits of the watersheds. Especially notable is the absence of sewage organisms from these streams, before the waters—mingling with fresh waters coming from districts outside the coal regions—have become alkaline; that is, while they still contain sulphur waters in sufficient quantities to characterize the streams. It is only during high stages of the rivers, when the mountain brooks are sending down floods in torrents to the main valleys, that the sewage from the mining settlements and the culm dust may be transported by water from the coal regions even to the sea. At such times the volumes of fresh water overcome the acidity of the mine waters and, the dilution being sufficient, preclude any germicidal effect of the acid mine drainage. Were it not for this disinfecting, germicidal action of waters drained from mines, the streams emerging from the coal fields would be large factors as polluting agents of the water supplies of Philadelphia, Pittsburg, Harrisburg and other cities. This power to destroy sewage organisms in natural water courses has been recognized by the State Department of Health in the decrees relative to sewerage issued in conformity with law, upon unanimous agreement of the Governor, Attorney General and Commissioner of Health. The spent tan-liquors from tanneries are known to exert a somewhat similar influence on sewage organisms. The experiments with these two wastes hereinafter described were made in order to determine what effect mine waters of a certain quality and spent tan-liquors of a certain quality would have on certain micro-organisms.

The waters on which these experiments were carried out were sent to the State Department of Health Laboratories from one colliery and from two tanneries in different parts of the State.

The samples are described as follows by the parties furnishing them:

THE MINE WATER.

"The mining is about the ordinary class of anthracite mining where the veins have a dip of about 30 degrees. The colliery has been opened by a shaft of 590 feet in depth and from the foot thereof gangways and tunnels have been opened eastward probably 2,500 feet and westward for about 8,000 feet in the Mammoth Skidmore Seven Ft. and Buck Mountain veins (all in the White Ash group) and with two to four lifts of about 100 yards each, where four lifts are worked the extra two being mostly in the Buck Mountain and Seven Ft. veins.

The water is that which is constantly flowing from the coal and surrounding strata and collected in ditches at one side of the gangways and tunnels and flowing to the lowest point in the mines or in this case the foot of the shaft from which point it is pumped to the surface and either wasted or used in washing the coal in preparing it for market. At this colliery all the water that is pumped during the daytime or working hours is used in washing the coal. The sample of water sent had not been used for any purpose having simply been collected and pumped in the usual manner and in this case collected by holding the jar under the discharge at the upper end of the column pipe.

This colliery prepares the coal by washing and uses the mine water exclusively for doing so. Some collieries use a proportion of fresh water for washing coal at times when fresh water is plentiful. At some collieries the mine water can be used for generating steam after having been in a measure "purified," but is never used when it is possible to get fresh, clean water for that purpose.

The water of this colliery has, so far as is known, never been used for generating steam.

I might add that what we sent is what may be considered a sample of the average water, but at the same time I wish to say that you would probably find no two samples of water sent from different collieries to be exactly similar."

THE SPENT TANNERY LIQUOR.

"One of the tanneries is a sole leather tannery using no bark but extracts for tanning. The principal tanning extract is quebracho—an extract made from a South American tree. Dry and salt hides are used and hair is removed by the lime process, not by sweating. The hides are soaked in water vats to soften them, then the fleshings, etc., are removed. The hair is then loosened by lime and removed by a de-hairing machine. Then the hides are placed in water vats and washed and then put in what is called a color wheel. This color wheel contains a very weak solution of tannic acid made by using the spent tanning liquors from the regular tanning process. After passing the color wheel, the hides are passed through acid vats to neutralize the lime and then through the regular tanning process. The color wheel from which the sample sent you was obtained contains the only tannic acid that is wasted. The sample was collected immediately before the wheel was emptied and shows the part of the tannery waste containing tannic acid. Two wheels are used each day and both deliver about 6,000 gallons per day to the total waste of about 100,000 gallons. The other part of the waste is from the soap fats, wash wheels and vats, lime vats, acid vats and de-hairing machine.

"The sample of the waste sent you causes but little trouble until the total waste reaches the creek, where the tannic acid combines with the iron in the water and forms the usual dark, inky color. The Stoneham tannery uses hemlock bark and no extract."

When the regular tan-liquor has become very weak, and the leather will no longer take tanning from it in the usual process, it is put into the color wheel. Then into the wheel is put the leather before starting in the regular tanning process, so that this new leather that has a great affinity for tannin will remove from this weak liquor all the tannin possible.

This wheel is drum shaped and the sides composed of strips arranged to allow free entrance and exit of the liquor contained in the vat in which the wheel is partly immersed and rotates.

For a matter of convenience the source has been represented on the second report by the letters A, B, C, D, E and F, which represented the different sources, as follows:

FROM CORRY.

A—From color wheel.

B—From general waste and contains waste liquor after its entrance into the settling tank with all the other waste.

FROM WARREN.

C—From the general waste and contains some tannic acid waste as well as all other waste.

D—From the color wheel. This wheel is similar to that at Corry, but the liquors when used in this wheel, are stronger than those used at Corry and contain more tannic acid. After the liquor has been used in the color wheel it is not wasted, but is added to stronger liquors and again used in the regular tanning process, so that there is no waste from this wheel to the stream.

E—Is a sample from what is called "run away liquor." This liquor is from the vat in which the leather is first put in the regular tanning process; because the leather at this time is new, almost all of the tannic acid is removed. This liquor is not wasted, as is the usual case, but is shipped to Ridgway, where it is used in making dyes and other by-products.

F.—Is a sample from what is called the bleaching process. This waste contains sulphuric acid, as well as tannic acid. After the leather has been tanned, it is passed through a series of vats containing different strength of alkali and acid for the purpose of removing the dark color obtained in the regular process and thus allowing of a lighter finish. This waste is allowed to run directly into the stream.

I—*Experiment on the Germicidal Action of Mine Water and Tan-Liquor on B. Typhosus and B. Coli Communis.*

1st.		At once.	15″	1′	3′	6′	24′	48′	72′	96′
Mine Water.	B. Typhosus .2 c. c. + 100 Sterile Tap Water,	190 000	---- ----	150 000	200 000	---- ----	600 000	1,000 000	---- ----	---- ----
	B. Typhosus .2 c. c. + 100 Sterile Mine Water,	2,500	----	0	0	----	0	----	----	----
	B. Coli .2 c. c. + 400 c. c. Sterile Tap Water,	1,400 000	---- ----	1,400 000	1,600 000	---- ----	1,400 000	----	----	----
	B. Coli .2 c. c. + 400 c. c. Sterile Mine Water.	580 000	---- ----	150 000	60 000	----	1,500	----	100	0
Tan-Liquor.	B. Typhosus .2 c. c. + 100 c. c. Sterile Tap Water.	110 000	---- ----	150 000	200 000	---- ----	600 000	1,000 000	----	----
	B. Typhosus .2 c. c. + 100 c. c. Sterile Tan-Liquor.	160 000	---- ----	135 000	400	----	0	0	----	----
	B. Coli .2 c. c. + 400 c. c. Sterile Tap Water,	1,400 000	---- ----	1,400 000	1,600 000	---- ----	1,400 000	----	----	----
	B. Coli .2 c. c. + 400 c. c. Sterile Tan-Liquor,	600 000	---- ----	420 000	420 000	---- ----	200 000	----	600	0

2nd.		At once.	15″	1′	3′	6′	24′	48′	72′	96′
Mine Water.	B. Typhosus .1 c. c. + 100 c. c. Sterile Tap Water.	54 000,000	50 000,000	54 000,000	50 000,000	54 000,000	54 000,000	----------	----------	----------
	B. Typhosus .1 c. c. + 100 c. c. Sterile Mine Water.	400 000	3	0	0	0	0	----------	----------	----------
	B. Coli .1 c. c. + 100 c. c. Sterile Tap Water---	80 000,000	80 000,000	70 000,000	75 000,000	70 000,000	----------	----------	----------	----------
	B. Coli .1 c. c. + 100 c. c. Sterile Mine Water,--	500 000	120 000	17 000	200	24	0	0	----------	----------
Tan-Liquor.	B. Typhosus .1 c. c. + 100 c. c. Sterile Tap Water.	600 000	700 000	400 000	500 000	----------	----------	----------	----------	----------
	B. Typhosus .1 c. c. + 100 c. c. Sterile Tan-Liquor.	200 000	60 000	7,000	600	200	0	0	----------	----------
	B. Coli .1 c. c. + 100 c. c. Sterile Tap Water,---	800 000	600 000	10,000 000	400 000	----------	----------	----------	----------	----------
	B. Coli .1 c. c. + 100 c. c. Sterile Tan-Liquor, --	500 000	300 000	240 000	120 000	100 000	210	0	----------	----------

The three experiments agreed very closely except that the germicidal effect of the waters seemed to decrease on keeping them under artificial conditions in the ice box. The first experiment in a dilution of 1-500 of typhoid bacilli in mine water showed that they were materially decreased in number when plated immediately after being suspended in the mine water, and that they were absent after one hour. After a lapse of 10 days, the typhoid culture in the same dilution was again materially reduced at once, but showed the presence of three colonies of typhoid after fifteen minutes suspension in the mine water.

In reference to the spent tan-liquor, the typhoid showed a slight reduction when plated at once and similar reduction after one hour emulsion and marked reduction after three hours and a disappearance after 24 hours. In emulsion of the tan-liquor after a lapse of 10 days, the typhoid showed slight decrease at once, progressive decrease up to the sixth hour and did not grow after 24 hours exposure. The controls were perfectly consistent and normal, gradual increase taking place after the emulsion was made in some preparations in sterile water.

In reference to the colon bacillus, the reduction is much less. There is still, however, a germicidal action. It showed a reduction in mine water after being plated at once, and continued to reduce although still present up to the third day. The dilution in the first experiment was 1-2000. The organisms failed to grow after the third day; in the second experiment ten days later in a dilution of 1.1000 the reduction is relatively greater than in the first experiment with a dilution of 1,2000, for the colon bacillus only grew up to the six and one-half hour and could not be found after twenty-four hours' exposure:

In reference to the tan-liquor, the reduction of the colon bacilli is comparable but much slower. The controls were normal in sterile water. It is therefore evident that in fresh mine water, the typhoid organisms will disappear at once, and when mine water has been kept under artificial conditions they do not disappear until one hour has expired. In fresh mine water, the colon bacillus will disappear after the third day, but when it is kept under artificial conditions may live longer. In the dilution of 1-500 (which is very high), tan-liquor has a germicidal effect upon typhoid after the third hour in fresh solution and after 24 hours in old solutions under artificial conditions. Spent tan-liquor shows much less effect upon the colon bacillus both when it is fresh and under artificial conditions, and shows a lower germicidal activity than the mine water throughout.

II—Experiment on the Germicidal Action of Tan-Liquor on B. Coli Communis and B. Anthracis.

Dec. 28th—Jan. 7th, 1909.

RIVAS.

B. Coli.	At once.	After 1 hour.	After 3 hours.	After 24 hours.	After 48 hours.	After 3 days.	After 6 days.	After 7 days.
0.1 B. Coli culture in 100 c. c. Tan-Liquor, A.	20 000	2000	0	0	0	0	0	0
0.1 B. Coli culture in 100 c. c. Tan-Liquor, B.	130 000	120 000	120 000	300 000	350 000	401 000	380 000	500 000
0.1 B. Coli culture in 100 c. c. Tan-Liquor, C.	170 000	90 000	90 000	30 000	200	2	0	0
0.1 B. Coli culture in 100 c. c. Tan-Liquor, D.	100 000	60 000	60 000	1	0	0	0	0
0.1 B. Coli culture in 100 c. c. Tan-Liquor, E.	1000	0	0	0	0	0	0	0
0.1 B. Coli culture in 100 c. c. Tan-Liquor, F.	8000	0	0	0	0	0	0	0
0.1 B. Coli culture in 100 c. c. Sterile Tap Water.	1200 000	1500 000	1100 000	6000 000	--------	--------	--------	--------
B. Anthracis.								
0.1 B. Anthracis culture in 100 c. c. Tan-Liquor, A.	30 000	10 000	8000	12 000	6000	7000	4000	10 000
0.1 B. Anthracis culture in 100 c. c. Tan-Liquor, B.	30 000	26 000	5400	5400	7000	8000	10 000	8000
0.1 B. Anthracis culture in 100 c. c. Tan-Liquor, C.	42 200	25 000	4000	4500	2500	4000	6000	5000
0.1 B. Anthracis culture in 100 c. c. Tan-Liquor, D.	14 000	10 000	8000	10 000	6500	7000	3000	3000
0.1 B. Anthracis culture in 100 c. c. Tan-Liquor, E.	50 000	20 000	10 000	8400	3000	5000	4200	3800
0.1 B. Anthracis culture in 100 c. c. Tan-Liquor, F.	40 000	28 000	16 000	7700	8000	14 000	9000	6000
0.1 B. Anthracis in 100 c. c. Sterile Tap Water.	120 0000	100 0000	120 0000	140 0000	120 0000	150 000	1400 000	1600 000
Sterile water control, ------------	0	0	0	0	0	0	0	0
Medium control, -----------------	0	0	0	0	0	0	0	0

A forty-eight hours' bouillon culture of B. coli and a very old culture of B. Anthracis, containing numerous spores, were selected for the second experiment. One-tenth of a c.c. of the above cultures was added to duplicate samples of the tan-liquor from the above sources (A, B, C, D, E and F). In one serial of each the B. coli was added and to the other the B. Anthracis, respectively; likewise one-tenth of a c.c. of the cultures of B. coli and one-tenth of the culture of B. Anthracis was added to two bottles containing 100 c.c. of sterile water as control.

After the addition of the culture to the tan-liquor and the sterile water controls, the samples were thoroughly shaken and plated at different intervals, the first plate being made at once after the addition (the operation taking about five minutes). They were plated again after one hour; after three hours; after 24 hours; after 48 hours; after three days; after six days and after seven days, respectively. The result was as follows:

The B. coli in the tan-liquor A disappeared after three hours. In tan-liquor B, no germicidal action was shown; in tan-liquor C, it took six days to disappear; in tan-liquor D, it took 48 hours to disappear. In tan-liquor E, the B. coli disappeared after one hour, and likewise in tan-liquor F.

The tan-liquor shows very slight germicidal action on the B. Anthracis; in no case did the latter disappear up to the seventh day, which is as far as the experiment has been yet conducted.

The tan-liquor A, E and F produced a decidedly germicidal action on B. coli after one hour. This action was less marked in tan-liquor D, taking 24 hours to disappear, and still less marked in tan-liquor C. It was apparently without any effect in tan-liquor B up to the 7th day. In general it may be said that the tan-liquor has a germicidal action as a whole, when it is compared with the control of sterile water to which the same amount of bacteria (one-tenth of a c.c. of the culture was added) because this latter shows the number of bacteria to be over 1,000,000 in contrast to the number found in the tan-liquid in which from the first plating at once, up to the seventh day, the number of bacteria has been gradually reduced and them to a complete disappearance, with the exception of tan-liquor liquor B, in which the reduction was never over 50 per cent. up to the seventh day.

To put the conclusions in fewer words:

Mine water will prevent the growth of typhoid bacilli after the lapse of one hour. Mine water will markedly limit the growth of colon bacilli so that they die off progressively and cannot be cultivated after a lapse of 24 hours. The organisms lived for three days but could not be found on the fourth day, in one experiment in which the dilution was high. Spent tan-liquor limits the growth of the typhoid bacillus and causes it to disappear after the sixth hour. Tan-liquor permits the growth of the colon bacillus up to the twenty-fourth hour and in one experiment where the dilution was 1-4000 it was found after three days.

As to B. Anthracis, the same may be said as in the case of B. coli, the tan-liquor in general producing a decided diminution in the number of bacteria, in all cases from plating made at once, up to the seventh day, but in no case was there a complete elimination of these micro-organisms from any one of the waters, showing, therefore, that the spores are not especially effected by the tan-liquor in question.

The only inference that can be drawn from the above experiments is that, so far as the risk of the most serious of all water pollutions is concerned, that by the typhoid bacillus and its companion and index, the colon bacillus, and inferentially of the cholera bacillus, which is known to succomb readily to sulphuric acid, the attempt to exclude mine water and spent tan-liquor from streams which may eventually become sources of drinking water would be a mistake. Evidently neither of these organisms can live for any considerable time in water containing these wastes in any appreciable quantity. Especially is this true of that most dangerous and elusive bacillus, that of Typhoid Fever. Data are not yet available to indicate to what distance from the mine or tannery the protective influence of these wastes will extend. That of the mine water will evidently continue effective to a much greater distance than that of the tannery waste. As the waste is occasionally infected with anthrax spores, it should never be discharged into the streams in an untreated condition.

There has long been an opinion prevalent among those who have studied the health conditions of Philadelphia that the acid condition of the head waters of the Schuylkill River, owing to mine drainage, was an important factor in holding in check the prevalence of typhoid fever in that city.

These results indicate that this opinion had a solid foundation.

Pennsylvania Health Bulletin

University
MAR
22
1910

No. 6. HARRISBURG, PA. December, 1909

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

WITHDRAWN

REPORT ON THE EFFECT OF REPEATED INJECTIONS OF PRODUCTS OF THE TUBERCLE BACILLUS ON LYMPHATIC ORGANS.

DEPARTMENT OF HEALTH LABORATORIES.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 6. HARRISBURG, PA. DECEMBER, 1909.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.

I.

The condition of the spleen in guinea pigs after treatment with tuberculin or some product of the Tubercle Bacillus like it, suggested that this organ might be the seat of some pathologic change after injections of these solutions. The question naturally arose whether the inexplicable deaths among cattle after testing might not in some way be connected with this substance. In the course of our work in this Laboratory, we have repeatedly encountered focal necroses in the spleen, and occasionally in the liver of guinea pigs and rabbits dying of the injections of the various tuberculins. These necroses were suggested by the naked eye appearance. The lymph nodes were not attacked by these areas, even those in close proximity to the point of inoculation. The foci of necroses were not sharply outlined but usually were surrounded by large lymph cells or endothelium. Around the older ones was sometimes a zone of polynuclears and round cells, rather indicating a throwing off of the necrotic remains. The endothelium is almost always slightly hyperplastic. In order to see if severe treatment of a healthy cow with tuberculin would produce anything similar to this an animal was injected six times, two weeks apart with 400 milligrams of Old Tuberculin under the skin. She did not react at any time. She was killed two weeks after the last dose and at autopsy appeared to the naked eye to be a healthy animal. The pathological histology of spleen, lymph glands and liver is as follows:

Lymph nodes: In none of a number of sections were there noted any areas of necrosis or focal development, suggesting tubercles. The glands are in some instances more or less hyperaemic. In all, the follicles and chords seem large. Many of the follicles show large endothelial germinal centers; and in the sinuses there is considerable endothelial swelling and hyperplasia. In other words, the notable features are a combined lymphoid and endothelial hyperplasis. To this may be added in some of the sections, in the medullary parts of the nodes a slight oedema of the connective tissue and a slight scattered polynuclear leucocytic and eosinophilic infiltration, and a minor grade of haemic pigmentation. Compared with the normal glands, there is perhaps a slight increase in the amount of endothelial cell proliferation; this is not very marked.

Spleen: There is not so much fibrosis in this organ as in that of the healthy control animal; and there is a decidedly larger size of the Malpighian bodies, which generally show central endothelial proliferation of marked grade. Some of the centers of endothelial hyperplasia show moderate necroses with swelling, vacuolization, and loss of nuclei. The endothelium in the spaces may also be seen to be necrotic, occasionally phagocyting or pigmented. There is a slight excess of polynuclear leucocytes in the pulp and the endothelium of the pulp is quite prominent. Here and there small multinucleated cells of endotheliod type occur, not, however, suggestive of the type of tuberculous giant cells.

Liver: Shows practically no changes beyond a fine vacuolation of the cells, which is however, unaccompanied by any staining fault of the nuclei or cytoplasm. There is a slight excess of small mononuclear cells in a few small areas, not in definite nodes but scattered along some parts of the interlobular connective tissue and along some of the intralobular capillaries. The capsules of Glisson are not increased for bovine livers, although the tissue about the bile-ducts is quite marked.

As a control, tissues were taken from an apparently normal healthy cow killed at the abattoir; they include material from the compound lymph glands and spleen. From the history which could be obtained of this cow, she had not received tuberculin lately. Neither is, however, normal. There is excess of fibrous tissues, notably in the splenic trabeculae and pulp, but also involving the lymph nodes; and in both there is both follicular and more or less diffuse endothelial hyperplasia; in both more or less well marked congestion and in the spleen a slight grade of haemic pigmentation. None of the centers of endothelial hyperplasia show any necrosis nor is there any phagocytosis.

This demonstrated that the prescribed treatment of this cow did not produce any distinct focal necroses. There was, however, a tendency for hyperplasia of the endothelium which went on to vacuolization and necrosis. This was more diffuse than usually seen in guinea pigs' spleens and affected frequently the sinus and endothelium.

Although the endothelium has suffered in both the guinea pigs and the cow, no hemorrhages were present either great or small, thus speaking against any lytic change. The phagocytosis and pigmentation rather leads us to attribute the degeneration to great proliferation incident to the toxemia.

II.

Note on Effect Upon Viscera of the Guinea Pig With Especial Reference to Spleen.

During our work on the products of the tubercle bacillus, we have observed closely the toxicity of the various soluble and somatic constituents of that organism upon laboratory animals as well as upon cows. Our histologic studies now comprise viscera from about sixty guinea pigs. Rabbits in our work, have behaved so differently among themselves that it is thought better not to include them in this study. In this communication, we wish to present the histologic observations upon animals which were treated with old tuberculin (1), tubercle bacillus toxin (Dixon's No. 10) (2), dead tubercle bacilli (3) and dead degreased tubercle bacilli (Dixon's No. 5) (4). These represent in a measure respectively strong and weak preparations of first, the poisons which are soluble in culture media and salt solution and secondly, the bacillary bodies in a condition incapable of producing transmissable tuberculosis. Most attention has been given to the salt solution extract of living organisms and dead. degreased bodies.

The methods employed consisted primarily of injecting large quantities of the various products in an attempt to determine the lethal dose in a healthy guinea pig. Standardizing of these preparations failed, as is usually the case. Repeated small doses were also given to large series of animals, some to act as controls and demonstrate the lesions, others to be later injected with tubercle bacilli to determine their condition of resistance. The animals which died after this attempt at active immunization are too few in number and are excluded from these observations. The few records at hand correspond very closely to those of animals treated *after* injections of living organisms. An experiment having as its purpose the sensitization of animals for the homologous product supplied material for observations as to the effect of large single and double doses of the products upon subsequent injections of tubercle bacilli. This was not done with tuberculin or the simple dead tubercle bacilli. Lastly, living tubercle bacilli were injected into a series of guinea pigs, some left for controls, while the rest were treated with repeated minute doses by subcutaneous injections.

---

(1) Old Tuberculin made according to old formula with the exception that no phenol is added.

(2) The organisms are the same for this as for No. 5. They are removed *living* from the culture medium into water and washed, all water is drained off and they are washed in ether for six hours and dried. They are then suspended in 90 parts by weight of .85 per cent. salt solution, shaken in a machine eight hours allowed to stand sixteen hours at room temperature and then filtered through a close Berkefeld. The resulting fluid is the Tubercle Bacilli Toxin of Dixon.

(3) Cultures of Tubercle bacilli are killed by autoclaving at 15 pounds, *dried*, ground up and emulsified in .85 per cent. salt solution which emulsion is standardized in milligram per cubic centimeter.

(4) The organisms are grown on veal glycerine broth and when about six weeks old they are killed by heating once in streaming steam, filtered off, dried, ground, weighed and extracted in a sobxlet, first with alcohol until color ceases to come away, then with ether until the cooled extract shows no cloudiness. They are then dried again, ground up in .85 per cent. salt solution, centrifuged three times until there is no sediment after ten minutes at 1000 revolutions; certain quantities of this emulsion are evaporated to dryness and the number of milligrams per cubic centimeter computed.

The doses under skin of the various products are as follows: with old tuberculin large doses of 100, 500 and 1,000 milligrams were given, while for the effect of repeated small doses 0.05 to 0.1 milligram were used. In testing the salt solution extract of living organisms 200, 500, 1,000 and 2,000 milligrams were injected and we treated the guinea pigs therapeutically with small doses of 0.05 to 5 milligrams, grading the dose by careful observation of the body weights. From .01 to .05 milligram of the dead tubercle bacilli were given, while with the dead degreased bodies from .001 to .05 milligram was used as a small dose. For larger quantities of the latter, controlled emulsions containing 6.5 and 8.64 milligram per cubic centimeter were employed. For sensitizing purposes, 25 and 10 milligrams were used.

These various dosages have some effect upon the rapidity with which the lesions developed and perhaps upon their extent. They do not have however, any influence upon the peculiar nature of the change. The physiologic results of these experiments are published in the reports of this Department.

The succeeding notes do not attempt to picture all of the anatomic and histologic lesions of experimental tuberculosis, either affected or unaffected by treatment. Our aim is to point out what effect the various products have upon the histology of the viscera in healthy animals and what are the differences between control and infected animals and those in which the progress of tuberculosis may have been modified by product treatment.

The living culture in use in our laboratory is one of high virulence and produces a widespread infiltrating caseous involvement of all viscera with exception of the spleen where the gross lesions are nodular, caseating late. The usual miscropic picture of all viscera is that of localities of endothelial and lymphocytic collections which go on rapidly to coagulation necrosis or immediate caseation. In the periphery polynuclears and small lymph cells are about equally mixed. The special feature of the liver lesions is an extensive interstitial appearance of endothelial and lymphoid cells into interlobular septa and involving the periphery of the tubules. This disarrangement and stimulation of new growth give rise to excessive columnar overgrowth appearing like new bile ducts and spoken of as such in some records. (They may be such and are now under careful study to form a separate report). The normally present bile ducts often show proliferation or even reduplication of their epithelium which, with the apparent growth of new bile ducts, suggests adenomatous or carcinomatous change. They are surrounded by connective tissue which early makes its appearance in the capsule of Glisson. In this infiltrate as well as in the bodies of the tubules, well defined tubercles may be seen. Extensive necroses may occur, expressing themselves by acid stain-taking areas, vacuolization of the protoplasm and bare pale or unstained nuclei. These are probably toxic since they occur too regularly and diffusely to be thrombotic or embolic.

The spleen and lymph glands are relatively less affected in the experimental control lesions. The first and most prominent change is in follicular tubercles which spread centrifugally and later become caseous masses. There is some coalescing of tubercles to form the mottled spleen but the tendency to widespread infiltration is more marked in the other viscera. Many tubercles remain in the precaseous stage. Probably the commonest seat for tubercles is the perivascular epithelium. Giant cells are scarce in all lesions of these animals.

These lesions form the basis of comparison with those met in treated animals. The gross lesions in the latter differ in practically no detail from the controls. We will now take up the various observations made on treated animals especially in the spleen where they are most easily recognized.

The effect of *tuberculin* on normal animals, either in one or two large doses or in many small ones is seen especially in lymphatic follicles. There is almost immediate endothelial hyperplasia which may occupy one-half the follicle. This goes on to great packing of lymphocytes in the outer rim with the early appearance of polynuclears. Soon the hyperplastic, central, endothelial mass shows faintness of cell wall, vacuolization and, in cases of long treatment or high dosage, complete necrosis; very late this is partly absorbed. An increase in the circumferential connective tissue of the follicles is also observed late.

In those guinea pigs primarily injected with tubercle bacilli and treated with tuberculin, the process is very rapid. There is evidence of early endothelioid hyperplasia in the lymphatic organs which rapidly gives way to massive necrosis by coalescing of tubercles, the margin of which necroses shows no recognizable histologic tubercles or giant cells; it is merely a low grade round and polynuclear cell zone often much congested. The lesions in other organs show the same tendency to great necrosis but the difference from the controls is less marked than in spleen.

Salt Solution Extract of Living Organisms. (No. 10) Repeated injections of this material into healthy animals in minute or large doses have little effect upon lymphatic organs. There is usually an increased hemolysis indicated by considerable phagocytosis and excess of pigmentation. There may be also slight follicular hyperplasia but it is chiefly lymphoid. In the sensitizing experiment with this product, one set of animals received one large dose of the salt solution extract and then tubercle bacilli while the second set received two doses. The first injection of the product and the tubercle bacillus injection were made on the same day so that the differences of the two could be noted. The animals died before the controls and showed at autopsy more widespread lesions, with more advanced necrosis. There was a very evident endothelial increase but it seemed to undergo degeneration as soon as formed. There was no effort at connective tissue increase. Instead of the spleen taking rather a secondary place in the extent of the lesions, as is the case in the controls. it was more affected than any other organ. Giant cells are practically absent. In the liver bile ducts and their epithelium were not proliferating but caught in the necrosing mass.

When the animals are primarily infected with tubercle bacilli and then treated with the extract therapeutically, the most pronounced difference between the control and treated animals lies in the greater necrosis of the latter. The tubercle, after passing through a very short endothelioid stage, rapidly necroses and spreads, whereas in the control the process is slower. There is however, in the treated animals, necrosis without any granulomataus tissue reaction, such as circumferential endothelial and lymph cell zones. The large necroses described under control tuberculous pigs occur in animals which die only a few days after the first therapeutic injections of the product, while the controls may live twice or thrice as long. In the spleen animals which have received several weekly therapeutic doses (8-15) a slight attempt at cellular reaction is found in the formation of experimental tubercles. These consist of an outer layer of lymphoid and polynuclear cells, within which is a zone of endothelioid cells enclosing a central necrotic core of granular material containing many nuclear fragments. Also in these animals which have been treated for several weeks we have a little tendency to connective tissue increase in the liver, with the appearance of the so-called new bile ducts having proliferated epithelium. This is not nearly so marked as in control animals.

Dead Tubercle Bacilli.

For observations upon the effect of this product, we have animals receiving one and three doses, but none therapeutically treated. These show us however, the character of lesion produced by this material. Grossly there may be fine nodules of the spleen or liver. These consist of a nearly typical gray tubercle devoid of caseation, and usually, of giant cells. The rest of the spleen is negative save for a slight follicular hyperplasia with central endothelial increase, minor congestion and hemic pigmentation.

Dead Degreased Tubercle Bacilli (No. 5).

With single or a few large doses of this product, the same effect is produced as when repeated small doses are given except that it is more pronounced. With either there is primarily an endothelial proliferation principally in the follicles but also in the chords. This goes on to nodular accumulations which in case of repeated large doses or rapidly succeeding small doses, may necrose in the centre by melting together and vacuolizing of the cells. About these nodes is a dense zone of lymph cells. The proliferated endothelium of the pulp is actively phagocytic. In the pulp multicleated cells may be found but not in follicles. In the spleens of guinea pigs which have received many doses an increase of connective tissue may be seen around the follicles. The same changes are seen to a less degree in the mesenteric lymph nodes.

For the sensitizing experiment with the dead degreased tubercle bacilli, we had two sets of animals, one which received one injection of the product and one which received two injections before the living organisms. They were carried on at the same time and with same control as those described under the salt solution extract of living organisms (No. 10) and with much the same result. The control lived about twice as long as the treated pigs. One could easily perceive however, that there was more endothelial hyperplasia which withstood the necrosis than in No. 10. There was also greater increase of the connective tissue in the liver, in the treated than in the control animals. "Experimental" tubercles were abundant in the lungs. We have come to look at these, rightly or wrongly, as indicative of some resistance.

The results of injecting Tubercle Bacilli into healthy pigs and following it with repeated small doses of the dead degreased bodies are conclusive in one point. In the control animals, the spleen and nodes were little affected, except for nodal endothelial hyperplasia while the other organs were greatly affected. In the present series, tuberculous changes were prominent in the spleen. There the process begins and is constantly accompanied by a progressive endothelioid proliferation which shows phagocytosis. In the animals treated longest, they are frequently of spindle shape and are in such close relation to definite connective tissue cells that the thought naturally arises that they are transforming into the latter type. Giant cells are also more frequent in the cases of longest treatment but very scarce in controls. Also experimental tubercles with noticeably increased connective tissue mantels are more numerous than in controls. That the tuberculous interstitial hepatitis is greater in one than the other is difficult to say, but the connective tissue part of it seems greater in the treated animals. There seems to be no doubt that the process goes on to necrosis more rapidly in the animal treated a short time than is the case in the controls. The reactionary tissue changes are greater in those pigs receiving 8-15 weekly doses than in the controls.

Combined Use of Dead Degreased Tubercle Bacilli and Salt Solution Extract of Living Tubercle Bacilli.

When these products are used alternately in small repeated doses, the histologic picture varies in different animals. There are evidences of endothelial proliferation and necrosis in lymphatic organs. In other words, the lesions partake of the characteristic effects of both products. The changes produced by therapeutic treatment by these two substances after injections of tubercle bacilli are not greatly different from the control animals but they combine some of the effects of the separate use of the products. The tendency to endothelial proliferation in nodes is accompanied by the rapid necrosis, but the former remains to be easily identified longer than in the control animals. The necrosis is rapid so that experimental tubercles are not common. There is however, an increase of connective tissue. This can be best seen in the edges of the splenic trabeculae and in the capsule of Glisson. There seems to be a great tendency to the spindle shape of the endothelial cell the formation of so-called new bile ducts and reduplication of epithelium in bile ducts and bronchi.

The preceding descriptions represent a composite picture of several animals in each series. The differences must be followed through many sections. The contrast between the effects of the two types of products represented (soluble and somatic) is not sharp but one can easily compare the effect of old tuberculin and the salt solution extract of living organisms together whilst a similarity exists between the effects of dead organisms and dead degreased bodies. As said in first paragraph, they represent respectively strong and weak preparations of each type and their effects are correspondingly more and less emphasized. It should not be forgotten that in the old tuberculin there is fifty per cent. glycerine and that the dead bodies have not been washed free of all metabolic products. Nevertheless the effects of these do not differ in nature from those of their weaker forms, the salt solution extracts and the dead degreased bodies respectively.

The essential effect of all the products is a stimulation of endothelial cells. The effects upon epithelium are now under investigation. After the primary overgrowth of endothelium the process is one of intensity and rate rather than of quality. There is however, an easily discernable difference in the rapid necrosis after treatment with the solutions and with the bodies, no matter whether the tubercle bacillus be injected before or afterward. The old tuberculin in large or many doses seems to be able to produce focal endothelial necrosis whilst the salt solution extract is only capable of effecting a lymphoid hyperplasia accompanied by increased phagocytosis and pigmentation. The emulsions of dead bodies of tubercle bacilli, whether degreased or not, have as their principal effect a continued endothelial hyperplasia with much less tendency to necrosis. There seems to be a greater increase in connective tissue after injection with these latter products. Indeed the only conclusion we wish to draw from this material is that injections of the soluble toxins of the tubercle bacillus seem to lead to an endothelial hyperplasia which tends to necrose without reactive inflammation much more rapidly than the nodal endothelial change following injection of dead bodies, whether degreased or not, which seems progessive and more often accompanied by new fibrous tissue growth. In reference to the combined use of No. 5 and No. 10 which represent the two divisions of the tubercle bacilius products we are unprepared to draw definite conclusion. We think however, that the dead degreased bodies have a more pronounced and lasting effect upon tissue reaction than the salt solution extract of living bodies as shown by great number of spindle shape endothelial cells and fibroblasts, especially also the new bile ducts and epithelial reduplication in the liver.

These differences between the two classes of change may be due to difference in dosage. It is not always possible to maintain comparative doses. The salt solution extract represents ten per cent. by weight of bacterial bodies, i. e., every cubic centimeter represents the extraction of .1 gram. We have found by experience that guinea pigs will stand repeated injections of a quantity equivalent to the extraction of .01 milligram for a long time, but if that amount be exceeded great care must be observed or the animal will rapidly grow thin and die. Similarly the dosage of .001 milligram of No. 5 is borne well. The former quantity is, to be sure, ten times as large as the latter, but is withstood about the same degree. Tuberculin, the stronger soluble product, is endured to about the same extent as the salt solution extract. In our experiments upon immunity production with these products, the average length of life of those animals treated with No. 10 and tuberculin is a trifle greater when compared with the controls than is the average life of animals treated with the somatic products as compared with their controls. By these references to other experimentations we have tried to control the toxicity of the various products.

I take advantage of this opportunity to express my appreciation of the valuable assistance given me throughout the above experiments by Drs. Allen J. Smith and Herbert Fox.

Laboratories of the Department of Health of the Commonwealth of Pennsylvania, University of Pennsylvania.

SAMUEL G. DIXON.

No. 10 Control lived, average 43 days. Treated, average 38 days.
No. 5 Control lived, average 49 days. Treated, average 33 days.

Pennsylvania Health Bulletin

APR 1910

No. 7. HARRISBURG, PA. JANUARY, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

WITHDRAWN

LITTLE DANGERS TO BE AVOIDED IN THE DAILY FIGHT AGAINST TUBERCULOSIS.

DEPARTMENT OF HEALTH LABORATORIES.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 7. HARRISBURG, PA. JANUARY, 1910

Entered as Second-Class Matter, August 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Little Dangers to be avoided in the Daily Fight against Tuberculosis.

Statistics carry no conviction to the common mind. When the average citizen is informed that TEN THOUSAND ONE HUNDRED AND EIGHT people died of Tuberculosis in Pennsylvania in 1908, he stares vacantly, says, "You don't say" and straightway forgets all about it. Numbers in the abstract convey no image to his mind. But if you point him to a funeral passing and tell him that in that white hearse lies the lifeless body of his next door neighbor's darling little girl, dead of tuberculosis, he is saddened and begins to think about his own precious ones and what it would be to him if one of them were being carried to her long home, and possibly for a few brief moments may give up thinking of dollars and cents and appreciate that there are other values to be considered and protected.

And then if he were told that the continued funerals of those more than 10,000 victims of a preventable disease would have formed a melancholy cortège stretching over hill and dale all the way from PHILADELPHIA TO PITTSBURGH AND BACK AGAIN. Or that if the obsequies of these 10,000 dead had been observed consecutively beginning at the beginning of that year, the observance would not only have continued uninterruptedly night and day throughout that entire year, but the dirges would still be chanting and bell tolling for NEARLY TWO LONG YEARS TO COME, he might be led to give some heed to the warnings with which health officials are continually annoying him. But perhaps after all his commercial instincts are the strongest, and if he could be led to comprehend the cold fact that ALL THE SO-CALLED BANKS IN PHILADELPHIA could not with their combined declared capital pay the money loss to the state from Tuberculosis in that single year he might come to the conclusion that, on a mere monetary basis, it is good business for the state and the city to vote liberal appropriations to the health authorities to enable them to adopt measures to check this inordinate loss. More than this, he might consider it worth while to acquaint himself with the methods which science shows to be of practical use in protecting his own life as well as those of his dear ones from the ravages of this scourge.

The INDIVIDUAL has his duty as well as the State. The private citizen as well as the official. The father must feel with the mother a joint responsibility for the protection of the health of his children. He should keep in mind the fact that THE SCHOOL AGE IS ONE OF VERY RAPIDLY INCREASING LIABILITY TO CONSUMPTION, and the not less important fact that the chief bulwark against the inroads of the germ of this disease is a vigorous constitution. It must be the parents' business to see that the children have PLAIN, WHOLESOME, NOURISHING FOOD, and do not ruin their digestion, which is the main basis of a good constitution, by stuffing with candies and dainties and eating at irregular hours. They should not be allowed tea or coffee unless by permission of the family physician. BOYS SHOULD NOT BE ALLOWED TO USE TOBACCO. Growing children should retire early, should not frequent evening places of amusement, should have at least nine hours sleep and should sleep with open windows, protected from drafts by screens if necessary. They should take a daily sponge bath of the body, followed by vigorous friction with a coarse towel.

If they have been pronounced to have weak lungs by a physician, they should be TAKEN FROM SCHOOL and brought up in the open air, in the country if possible. All school children should spend at least three hours in the open air every day. Exercise in the gymnasium, while very well as a part of the school curriculum, should not be allowed to take the place of out door play.

OUR CHILDREN ARE BEING EDUCATED UNDER TOO HIGH PRESSURE. It flatters a parent's vanity of course to have his child getting 100 in all his studies, but this satisfaction may be dearly bought by reducing the child's bodily resistance to so low an ebb, that the tuberculosis germ, ever on the watch, finds the child an easy prey. Teachers are too apt to forget that their pupils have bodies as well as minds, and to sacrifice the health of the children committed to their care on the altar of their own reputation as pedagogues. Parents should be more careful to see that their children are not urged to overuse their brains than to spend too little time on their studies. Children should be provided each with its OWN DRINKING CUP, inasmuch as the germs of Tuberculosis or other diseases may easily be conveyed to the cup or glass used in common and so transmitted to the mouth of the next child using it. In the same way the apple or cake bitten, or the stick of candy sucked, by one child and generously held to the mouth of a comrade, may be the means of conveying contagion. The borrowed slate pencil is sure to be put in the mouth, and the pocket handkerchief used by a person having a cold may readily transmit the bacillus of the cold, and so of a more serious disease, to a friend who thoughtlessly uses it.

Especially in private schools, which are apt to be only old dwellings adapted, and usually ill-adapted, to school purposes, children are too often crowded together INTO ILL VENTILATED ROOMS where the atmosphere becomes loaded with carbonic acid and the poisonous products of human waste exhaled from the lungs, placing the pulmonary mucous membrane in the most favorable condition to become the culture-bed of a floating tubercle bacillus.

Woman's instinct long ago taught her that THE SOLES OF THE SHOES should be wiped as clean as possible before entering the house and the father should both by precept and example urge the children to scrupulously follow the mother's instructions in this particular. In this way much of the germ laden filth of the streets which now becomes incorporated in our carpets to be distributed through the air of the house and deposited on the food by the agency of the broom and the feather duster would be excluded. This street filth has been actually demonstrated to contain the germs of tuberculosis. It is easy to understand how the creeping baby quickly contaminates its moist hands with this morbific material and as quickly, following its instincts, conveys it to its mouth and thus becomes infected with tuberculosis.

The Turks, whom Western Europeans are fond of calling unspeakable, do not wear their soiled street shoes into the house at all, and thus give us a lesson.

THE CONSUMPTIVE MOTHER OR NURSE who first puts the spoon between her own lips in order to test the temperature of the porridge she is about to give the infant will probably convey germs from her own saliva directly to the food of the baby.

But it is not the infants and children alone who are in constant danger of becoming affected with this contagion. We are each one of us in hourly danger. Our PUBLIC LAUNDRIES make no distinction between the clothing of consumptives and non-consumptives, and unless the laundrying process is conducted for a sufficient length of time at a temperature above 150 degrees, there is most serious danger of the transmission of the organisms of tuberculosis from those of the former to those of the latter. The transmission of smallpox in this manner is a not unusual occurrence.

If we know that a friend has tuberculosis, we shall be wise if we avoid shaking hands with him, and we shall be extremely careful whom we kiss or whom we ALLOW OUR CHILDREN TO KISS.

THE FAMILY TOOTH-BRUSHES stacked together in a common receptacle in the bath room are in an admirable juxtaposition for the transmigration of microbes from one to another.

If a change of residence becomes necessary the thoughtful father of a family will make every effort to learn THE PREVIOUS HISTORY of an already occupied house which he is proposing to occupy, what diseases have occurred within its walls and especially whether there has been a case of consumption in it. If so he will consult a competent sanitarian to determine what steps ought to be taken to make the dwelling fit for occupancy for himself and his family, if indeed the history be not such as to at once preclude the thought of moving into it at all.

We shall view with a most wholesome suspicion the COMMON OYSTER FORK kept in a tumbler of water at an oyster stand, which goes from tumbler to mouth and from mouth to tumbler again until the water become a blend of water, saliva, oyster juice and bacteria, while the fork is not cleaned until the end of the day, if then.

Many people in counting PAPER MONEY have a pernicious habit of moistening their fingers with their lips in order to make the bills stick to them—and thus of course impregnate them with their saliva and whatever it may contain. Any one who subsequently counts this money, adopting the same method, must necessarily convey these contents to his own mouth.

Paper is not so expensive a material that banks and especially the United States Government are excusable for KEEPING BANK NOTES IN CIRCULATION long after they have become filthy to the eye, disgusting to the nose and veritable nests of morbific germs.

Cases are on record in this department where bank clerks or accountants by using the same method for turning the leaves of their ledgers have left a trail of tuberculosis behind them for a series of years.

THE PRICK OF AN OLD PIN picked up from the street or floor may convey contagion and thus produce a tuberculous ulcer.

The blanket which we pull over us IN THE SLEEPER may have been sprayed all the night before by the moisture expelled by the convulsive cough of a consumptive on the way to a sanatorium. The careful traveller will therefore insist that the blanket be covered by a fresh clean sheet the turn down of which shall cover it for a distance of two feet from the top.

Knowing that from the same general cause the dust of the car may very possibly have mingled with it the germs of disease, he will decline to stand up to be brushed by THE OFFICIOUS PORTER, whose well meant efforts would thus redistribute these germs all through the air of the car and into the lungs of his fellow passengers as well as himself.

My lady returns from her shopping tour, her WHITE GLOVES BLACKENED from contact with the FOUL STRAPS that our admirable system of transportation compels her to suspend herself by in the street car. How many hands, gloved or ungloved, principally the latter, washed or unwashed, principally the latter, grimy and moist, have grasped the same straps before her. And yet when she goes home instead of giving her soiled gloves an antiseptic bath, she tosses them in among her laces and kerchiefs little recking of the contamination they may carry.

The large majority of the letters in our morning mail will have been licked by our correspondents, some of whom will probably have been consumptive, in order to stick the flap, and if we open these with the finger we will stand a fair chance of setting free germs which have been imprisoned.

Attention to these little precautions in family and personal life will very quickly become a matter of habit and will entail little inconvenience.

Those who have become aware that they are themselves infected with tuberculosis owe it to their family, their friends and society to acquaint themselves with all the precautions which are insisted upon by health authorities in order to avoid becoming germ distributors. By observing these carefully, consumptives, save in the very late stages of the disease, may mix freely with their relatives and society and attend public gatherings, churches and amusements with entire freedom and with a perfectly clear conscience, while at the same time they greatly increase their own chances of avoiding reinfection and of prolonging their own lives.

1910

Pennsylvania Health Bulletin

No. 8. HARRISBURG, PA. February, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

WITHDRAWN

THE OBJECT TO BE ATTAINED BY THE MEDICAL INSPECTION OF SCHOOL CHILDREN.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 8. HARRISBURG, PA. FEBRUARY, 1910

Entered as Second-Class Matter, August 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Object to be Obtained by the Medical Inspection of School Children.

For many years after the idea of public health, or state medicine was conceived, it was considered that measures designed for the protection of the public at large—the people as a whole—were all that were necessary or even expedient. Then it began to be realized that a very important part of the population had a death rate all its own, namely the infants, and that if this enormous sacrifice of baby life was to be curtailed, special means must be adopted for their special protection. Furthermore those who were studying the training of our children became convinced that school children would be saved much discomfort, as well as sickness, if their surroundings while in school were made as healthful as possible. In accordance with this thought every possible pains was taken to diminish sources of disease and ill health in and about schools, and, inasmuch as school directors do not always appreciate the necessity for modern improvements in such matters, it was found necessary to institute school inspection in which inquiry should be made as to the mode of construction, drainage, heating, lighting and ventilation of school houses, and other matters which more or less seriously affect the health of pupils. But it was still found that, with all the care in construction and management of the school houses, as soon as the children were called in from their vacations and crowded together in school rooms sickness began to develop among them, especially from such diseases as are generally called contagious or communicable. It was evident therefore that there was a direct connection between the assembling of the scholars and the increase of such affections, and while it might have been going too far to pronounce the schools "hot-beds of disease," as has been done, the situation was evidently serious enough to demand the adoption of some new method applicable to children of school age alone. At first the educational body resented the imputation that schools were a menace to the health of the pupils and therefore to that of the public. But little by little the pertinacity of doctors, health officers and sanitarians has had its effect and educators have become educated to the point of admitting that there is room for improvement, and of accepting the Medical Inspection of School Children as a measure fraught with the greatest value to the rising generation.

This procedure it will be noted has nothing in common with the inspection of schools. A school, that is to say a school building, may be inspected by any person of average intelligence and education. A child can be inspected only by an educated physician. Hence the phrase "Medical Inspection of School Children."

The first thought in the mind of those who advanced this project was that the so called childrens' diseases, measles, chickenpox, whooping-cough, scarlet fever, mumps and diphtheria were conveyed from pupil to pupil in school and that this communication took place in two especial ways: first, from children suffering from the disease in its earliest stages or in a very light form, and, secondly, from children supposed to have recovered from the disease but still carrying the germs in their system, or upon their persons, as for instance diphtheria germs in their noses and throats or scarlet fever germs in the scales on the skin. It needs no argument to prove that the school teacher has not enjoyed the special education needed to discover whether a child who appears to be dull and listless is suffering from the first stage of scarlet fever or diphtheria, or whether a roughness of its skin is caused by the peeling of scarlet fever. Therefore, it was said, 'since we know that this danger exists and since we know that a teacher is not capable of judging whether a child it too ill to stay in school or is likely to convey a contagious disease to its fellow-pupils, let us have a physician visit the school at a certain hour and let the teacher send each child about whom she has any doubt to a certain room where the physician can examine the child and determine the question.'

No sooner was this theory put to the test by establishing a system of medical inspection in a few of our large cities than its truth was proven beyond a question.

The first day that Medical Inspection went into effect in the schools of New York, 140 children were found to be ill with dangerous contagious diseases or affected with contagious skin diseases or infected with parasites.

In Boston during the first four months, 5,825 pupils were found to be sick, of whom 1,035 needed to be sent immediately home. Of these 286 were capable of spreading the disease from which they were suffering to their fellow pupils. The New York report for the year 1905 presents the following figures:

Number of visits to schools, ...	46,605
Number of children examined, ...	2,190,527
Number of children excluded, ...	6,495

In the annual report for 1905 of the Board of Health of Philadelphia, in which city this duty was assigned to the fifty Assistant Medical Inspectors, we find that during that year the total number of schools visited was 315, the number of visits made was 51,412, the number of pupils referred to inspectors by principals for examination, 74,524, the number of individual examinations was 141,303, the total number of pupils inspected was 215,827, the number excluded from school was 7,598, the number of pupils found to be requiring medical care, but not needing to be excluded from school was 27,481.

In the city of Chicago, during a period of four months 233 schools were visited with the result that 1,417 cases of diphtheria and 306 cases of scarlet fever were discovered in actual attendance on school. Every one of these cases let it be remembered, might have been the starting point of an epidemic. Not only in the large cities however, but in many of the smaller ones and even in villages has such a system been put into successful practice. Among them may be mentioned Milwaukee, Wis.; Newark, N. J.; Cleveland, Ohio; Orange, N. J.; Newton and Brookline, Mass.; and Asbury Park, N. J.

Now, as to the results of this plan What has been accomplished by it to justify the expense and trouble which it involves? In a general way it may be said that the fact that both abroad and in this country wherever it has been inaugurated it has been continued is a sufficient indication that results have been obtained in the interests of education, or of health, or both, which, in the estimation of the authorities and the people, justified it.

In the city of New York an infectious form of eye disease called Trachoma, was known to prevail but there was no way of determining to what extent. In the Spring of 1902, several especially instructed inspectors were detailed to determine this question as far as school children were concerned. The report showed that 17 per cent. of all the school children were suffering from this painful and disabling affection. Immediately the dispensaries and hospitals were overrun with children who desired to obtain certificates showing that they were under treatment so that they might be able to return to school, and it was found necessary to open a special hospital for the treatment of this disease alone. The following are the figures for the work of this hospital in the year 1903:

Number of cases treated by operation, ...	4,337
Number of cases treated without operation, ...	11,599
Total number, ...	15,936

Remembering that this disease always seriously impairs vision, and often produces blindness, it will at once be seen how greatly the educational capacity of this large number of children was increased by curing the trouble, as well as how great a menace to other children was removed.

One of the most serious communicable diseases of childhood at the present day is known to be diphtheria. In 1900, the deaths from this disease in the United States were 16,475, the great majority of whom were school children. In this State alone between 2,200 and 2,300 deaths from this disease take place annually, of which it is safe to put down 70 per cent. as of children of school age.

In Chicago medical inspection was instituted in 1900. During the year preceding 3,931 cases of that disease had occurred of which 843 were fatal.

During 1900 the number of cases fell to 3,303, a decrease of 628, and the number of deaths was reduced to 797, a decrease of 46.

Of course, a single instance of this kind cannot be considered conclusive but it is at least significant.

The Massachusetts State Board of Health does not hesitate to express its conviction that medical inspection is retarding the spread of diphtheria in that state.

In Chicago, so far as scarlet fever is concerned, a diminution of 2,325 cases and 307 deaths was shown as compared with the year preceding inspection.

Similar good effects have been noted in other cities but exact figures to demonstrate them are not available. One most important result of such a system of inspection which was probably not anticipated is the discovery of unreported cases of contagious disease at the homes. In Chicago 744 cases of diphtheria discovered in schools brought to light 2,619 cases of that disease at home, while 231 cases of scarlet fever discovered by the school inspectors disclosed 745 cases at home. It can readily be seen how many most promising epidemics had thus been absolutely nipped in the bud.

It is a singular fact that a persistent and conscientious effort to remedy one evil is almost sure to unearth another. The medical inspectors of schools very soon became aware of the fact that while a certain number of the pupils were actually too sick to go to school and were a direct menace to the health of their fellows, an even larger number, while not too ill to attend school, were afflicted with some form of disability which made it worse than useless for them to go to school, because they did not possess the faculties which were requisite to profit by the instruction which they received. These disabilities were principally with regard to sight or hearing. The poor children were either half blind or half deaf.

A case is recorded where a child went to school for two years without being able to learn his letters. On examination he proved to have so high a degree of astigmatism that it was impossible for him to distinguish one letter from another. Glasses made a bright boy of him. Not less serious although probably less frequent is the interference with a child's progress in consequence of defective hearing. A boy 13 years of age was found still in the primary grade of a certain school seeming to be hopelessly dull. Careful examination developed the fact that his hearing was very defective. Facilities were afforded for overcoming this disability and from being at the foot of his class he was soon at the head. In Boston 20.33 per cent. of the school children were found to be more or less disabled from receiving instruction from this cause.

In Terre Haute, Indiana, out of 491 children examined 125 were found defective in hearing, and yet only 3 had been so recognized by their teachers. Already in some cities, prominent among which is Chicago, public day schools for the deaf have been established. This is mentioned simply as an indication of the frequent occurrence of deafness in school children.

A condition of the throat known as adenoids is now recognized as a very frequent cause of mental dullness and the relief of this condition is often followed by a most astonishing improvement both in the mental brightness and the moral disposition of the child.

In the examination of 5,321 school children of Los Angeles, 2,241, or 61 per cent. were found defective in eyesight; 1,170, or 22 per cent. defective in hearing; 1,835, or 31 per cent. had adenoids; 1,390, or 25 per cent. had enlarged tonsils.

Besides the above, many diseased conditions of these important organs were discovered.

In the examination of 50 bright pupils and 50 dull pupils, selected by 6 teachers on account of their marked brightness or dullness, 8 bright ones were found defective in some condition of the eye, ear, nose or throat, and 43 of the dull ones had some easily-detected and marked defect of these organs. This proportion speaks for itself. The dull ones are the defective ones, and the defective ones are the dull ones. As these little ones were lined up, the practiced eye of the physician could see at a glance that this one or that one had some physical defect, and in most cases the diagnosis could be reached without a detailed examination. Upon the tests being applied additional defects were discovered.

In the public schools of New York City there failed of promotion in their grades last year over two hundred and fifty thousand pupils. Doctor Maxwell, superintendent of the New York schools, claims that the root of the trouble is the physical unfitness of the children, owing to lack of nutrition and physical defects, to do reasonably good school work.

To correct these physical defects there are now 200 doctors and 200 nurses, and a large supervisory force engaged in the work of examining the children and seeing that they are properly cared for. Not all of the pupils have yet been examined, but last year, out of 142,000 children examined, 108,000, or 76 per cent. were found to be suffering from non-contagious physical defects.

The Commissioner of Health, Doctor Darlington, says that the medical inspection will reduce the number which fail of promotion so greatly as to save from the school funds much more than the cost of inspection, and make the schools much more efficient.

"Our children belong only to us," say some of the parents "to do as we please with them." "No," replies the Commonwealth, "they belong in part to you and in part to the whole people, and we, the people. do not intend that they shall grow up in ignorance, or that their education shall be interfered with by your neglect to keep their bodies in sound condition so that they may profit by the instruction which we are providing for them. We require you to send your children to school for so many hours daily during so many months in each year and we expect you to exercise reasonable care in maintaining the health of your children, and especially in respect to such diseases as are liable to be conveyed to other children. As, however, the constant exercise of such care may be a burden and expense to you, we are willing to share it with you, during the time that we are responsible for their care." This seems a fair statement of the case, and any parents who consider this provision an infringement on their liberties need to go to school themselves to learn the true meaning of the word liberty. Such individuals are fortunately few. Dr. Somers, of Philadelphia, who has made a careful study of this subject, embodying his results in an admirable prize essay, states that "out of 76,805 examinations made in Chicago there was but a single law suit instituted by parents," and that in this, the only case which he has been able to discover, Judge Ball of the Superior Court, decided that the medical inspection of schools was constitutional, and the case was not appealed.

The recent awakening of interest in the subject of that most destructive disease tuberculosis has brought to light a fact not generally appreciated, namely, that tuberculosis is quite a frequent disease of childhood.

In proof of this I present a few figures.

Kirchner in a recent table based on Prussian statistics, quoted by Lawman, seems to show that a sudden rise in tuberculosis mortality in children commences at the fifth year and rapidly increases, showing that in that country at least "certain conditions enter the child's life during the school period which enormously increase his risk of dying of tuberculosis." The early point of attack seems to be the bronchial glands. In these glands the germs of the disease may lie dormant for many years. Many of the inscrutable fevers of childhood are due to these glandular affections, which are often the point of departure of the graver tuberculous affections.

"In the tuberculosis dispensary of Cleveland, Ohio, every Saturday afternoon is devoted to the examination of the children of families in which tuberculosis exists. Out of 500 examined, 20 per cent. have shown by physical signs, although the general condition of the child is good, that ganglio-tuberculosis (tuberculosis of the glands) exists."

Roux and Jousserand practiced clinical examination by the radioscope and found that 44 per cent. of the children examined in the schools of Paris and Cannes were tuberculous."

Kirchner also states that as a child grows older the acute contagious diseases are less serious and tuberculosis become more serious.

"In the first year of life," he says, "whoopingcough, measles and diphtheria claim more victims than tuberculosis."

"In the second year measles, diphtheria, whoopingcough and scarlet fever each has a greater mortality than tuberculosis which occupies a fifth place in the mortality rate."

"From the third to the fifth year tuberculosis occupies a fourth place with reference to causes of death."

"From the sixth to the tenth year tuberculosis occupies the third place."

"From the eleventh year on tuberculosis occupies the first place."

In the year 1906 out of 9,258 deaths from pulmonary tuberculosis, in this State, 1,456, or more than fifteen per cent. were of persons under twenty.

Of children over five years of age, and under nine, 39 died of that disease, of those between nine and fourteen, 166, and of those between fourteen and nineteen, 784, showing a most alarming increase during the later period of school life.

From our present knowledge of the conditions essential to the cure of this affection, we are warranted in the conclusion that overcrowding and lack of ventilation are potent factors in bringing about this unfortunate result. Even more dangerous than the gaseous carbon dioxide are the organic effluvia which are given off from the lungs and body, as is generally recognized.

The investigations of our County Medical Inspectors and Health Officers soon developed the fact that throughout our rural districts the excellent laws which the legislators had provided for the construction and management of schools in the interest of the protection of the health of our school children were far more honored in the breach than in the observance, and so serious were these conditions found to be that in 1908 the Department considered it its duty to inaugurate a system of sanitary inspection of school buildings through its health officers. The results thus obtained more than justified the steps, and subsequent semi-annual inspections indicated that the school authorities were waking up to the necessity for more careful observance of the laws. In the meantime, however, such admirable results were following the introduction of the medical inspection of school children in cities that the idea of its attempt in the country districts naturally suggested itself. Daily or even weekly inspection as practiced in cities was manifestly an absolute impossibility, but would it not be possible to accomplish much good by a less frequent examination of the children made at regular intervals? Especially did it appear to the Commissioner that defects of vision and hearing, deformities, faulty nutrition, and incipient tuberculosis could in this way be detected in time to save much suffering, great waste of educational facilities and, indeed, many lives.

On careful deliberation it has been decided therefore to place the supervision of the whole system of school inspection in the hands of the County Medical Inspectors, including both sanitary inspection of buildings and grounds, and medical examination of the children. With this object in view the health officers, few of whom are physicians, are to be relieved of this duty, and only physicians are to be entrusted with it.

The reports of inspections are made on score cards for the sake of economy of time, uniformity and conciseness. One of these is marked Sanitary Inspection, the other Physical Record. On the first is recorded the sanitary condition of the school rooms, grounds and outbuildings including provisions for light, heat, ventilation, water supply and sanitary conveniences. On the second the age and sex of the pupil, the condition of sight, hearing, respiration, skin, teeth, cervical glands, contagious diseases, pulmonary tuberculosis and deformities. In recording deformities they are to be classified as those of the spine, the chest and the extremities. Those of the extremities are to be further described as congenital or acquired. Under the heading of skin diseases are noted pediculosis, scabies, ring-worm, impteigo contagiosa, favus, molluscum contagiosum, erysipelas and tuberculosis.

Each eye is to be tested separately, using Snellen's Chart at twenty feet, indicating the amount of vision as a fraction, the distance at which the child is standing, namely twenty feet being used as the denominator and the numerator being the size of the type which the child is able to read at that distance. The presence of blepharitis, conjunctivitis, iritis or trachoma or any affection of the cornea is then to be noted. Care must be taken that the children do not memorize the letters.

Each ear is likewise tested separately for accuracy of hearing by whispering at twenty feet, the distance at which the whisper is heard being used as the numerator and the distance at which it should be heard being given as the denominator of the fraction.

The presence of a discharge from either ear is then noted, and its nature.

Defective teeth and nasal breathing are to be noted. Enlargement of the cervical glands is to be observed. With regard to nervous conditions the existence of chorea or epilepsy is to be stated, and the general condition of nutrition.

If indications of present or recent contagious disease are found note is made of the fact and the exclusion of the child and its brothers and sisters at once ordered.

Gentleness and tact will be employed in the personal inspection so that its value may not be impaired by mental disturbance on the part of the child.

The medical inspector will under no circumstances advise as to the selection of a physician or communicate with the family of a pupil personally with regard to the results of the examination, all reports to the family being made directly from the Department.

SAMUEL G. DIXON, M. D.

Pennsylvania
Health Bulletin

No. 9. HARRISBURG, PA. MARCH, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

WITHDRAWN

CONSERVATION OF HUMAN LIFE IN PENNSYLVANIA—THE RESULTS OF FOUR YEARS WORK OF THE DEPARTMENT.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910.

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 9. HARRISBURG, PA. March, 1910

Entered as Second-Class Matter, August, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

CONSERVATION OF HUMAN LIFE IN PENNSYLVANIA—THE RESULTS OF FOUR YEARS WORK OF THE DEPARTMENT.

Three Million Dollars spent in Conservation of Public Health shows a saving of twenty-three Million Dollars to the Commonwealth.

The lives of thousands of little children have been spared because the State in its wise beneficence has furnished Diphtheria Antitoxin for the poor.

Typhoid Fever is killing 2500 less people per year in Pennsylvania than it did four years ago.

Tuberculosis now claims 1000 lives less every year in this State.

Industries seek states where health records show a low death rate.

In the last four years the State of Pennsylvania has been engaged in conservation work of an extremely important and fundamental kind. With President Roosevelt it believes that the preservation of the people's natural resources should begin with the preservation of the people themselves. The public cannot conscientiously permit the wasteful sacrifice of its forests and its other forms of natural wealth, but even less conscientiously can it permit the wanton sacrifice of its children's lives.

In maintaining a fully equipped State Health Department and engaging on a large scale in this great warfare against disease, Pennsylvania has taken a foremost stand for real modern civilization. The creation of governmental agencies for the preservation of the public health marks a new conception of governmental responsibility. The work thus far marks only the beginning—merely suggests the good which this department (under the direction of Dr. Samuel G. Dixon, the commissioner), has in view.

In the last thirty years the attitude of the public towards ill health has radically changed. Until the researches of that resourceful genius Louis Pasteur, disclosed the real cause of contagious diseases, the average man's conception was practically that which had prevailed in the middle ages. The infections were merely manifestations of the inscrutable wisdom of Providence, expressions of divine wrath; punishments for sinful human kind. Even the scientist regarded them as fundamental facts of nature, like death itself, which everyone must uncomplainingly accept. Pasteur, however, in a few masterly experiments, brushed aside all this ignorance and superstition. He showed that all contagious diseases had a clearly defined and obvious origin. They were not mysterious visitations, without tangible cause and insusceptible to tangible control. They were caused by an infinitely large universe of infinitely small forms of vegetable and animal life. He demonstrated that the connection between these malevolent microorganisms and the ensuing disease was as close as that between sunlight and heat. And he also immediately drew the inevitable conclussion. If the world were once rid of these organisms, he declared, it would be rid of contagious diseases. "It is now within the power of the world"—such was the deduction which he drew from his experiments, "to rid itself of all contagious diseases."

SETTING PACE IN HEALTH WORK.

This was the goal at which Pasteur aimed; that has been the goal at which all movements for improving the people's health have necessarily aimed since. And this was the ultimate ambition which led, five years ago, to the organization of the Pennsylvania State Department of Health. A Pennsylvania in which there shall be no young men and women languishing away with tuberculosis; a Pennsylvania in which no children shall die of diphtheria; a Pennsylvania in which there shall be no typhoid, no scarlet fever, no smallpox, no meningitis, no dysentery, no malaria—this is the kind of Pennsylvania which the State Department of Health hopes ultimately to create. It does not expect to reach this goal in a year, or ten years, perhaps not in a single generation, but this is the ideal that it has constantly in mind. It recognizes the fact that, so long as any of these diseases exist, their prevalence is a distinct reproach to the State. It is a reproach simply because the method of eliminating them is known. The old theory of government as a power which protects its citizens only from foreign foes and native marauders is giving way to new standards of civilization. The greatest enemies to the State are those which are unseen, and the first duty of an enlightened commonwealth is to protect its people against them. Other states are gradually rising to this new conception, but Pennsylvania now clearly heads them all, for in no other state is the battle against the common enemy being waged on so large a scale as here. The experiment therefore, is not only of extreme importance to Pennsylvanians, but as an example to the nation and the world.

DOES IT PAY.

Naturally the people are interested to learn precisely how the large sums the State is investing annually in good health are being spent; what are its dividends, as measured in the actual saving of human lives? Is Pennsylvania a richer, a more healthy commonwealth now than it was four years ago? Is the average citizen less likely to acquire a mortal disease—less likely to die if he does acquire one?

In exchange for its generous appropriations Pennsylvania has received, first of all, a considerable reduction in its death rate. Not so many people die here now as died in 1906, the year when the new department began its organized work. The citizens of Pennsylvania, especially its little children, stand a better chance than they formerly did of reaching mature life and a green old age. Mortality statistics do not commonly furnish exciting reading, but, when considered from this point of view, they make an emphatic personal appeal. Thus, in 1906 and 1907, the death rate in Pennsylvania per thousand of population was 16.5; in 1908, it had dropped to 15.7, and in 1909 to 15.3. At first glance this may not seem a remarkable diminution, but in a state with a population of more than 7,000,000 even a fractional decrease is a substantial gain. This appears when one figures precisely what this slight numerical drop means in the actual saving of human lives. Had the death rate of 1906 and 1907 prevailed in 1908, precisely 5,519 more people would have died than actually succumbed. Had this same rate applied in 1909, instead of the decreased percentage recorded by the Bureau of Health, just 8,388 men, women and children now living and presumably in good health and spirits, would have rendered their final tribute to nature. In other words these matter of fact statistics, when interpreted in their real relation to the welfare and happiness of the State, mean the saving to the State of 13,907 lives.

HUMAN LIVES AS STATE ASSETS.

This fact has an immense personal meaning for all people of the State—among these rescued lives might have been your own,. your wife's, your child's; but they also have a value which is measurable in dollars and cents. The political economists now recognize that the most valuable kind of wealth is the human life—that human labor is worth at least five times that of all other forms of capital. Even the newly landed immigrant, according to these investigators, has a per capita value of $875; that is, he adds just that much to the nation's capital. Professor Irving Fisher, of Yale, one of the foremost American economists, has painstakingly figured the financial value to the State of every citizen at particular ages. A new-born infant, says Professor Fisher, is actually worth $90, while a five-year old child is worth $950. From this point on his value rapidly increases; at ten, could he be sold at auction, his market value would be at least $2,000; at twenty it would be $4,000, and at thirty, $4,100. From this point the average human being begins to lose value, in proportion to his decreasing productivity, until at fifty, Professor Fisher gives him a value of only $700. This same authority places the worth of the average life lost by preventable diseases at $1,700. Taking this as a basis the decreased death rate in Pennsylvania for the last two years represents a money saving of $23,641,900. The State, in other words, is just that much richer—has just that much more available capital. For its actual expenditure to date of $3,000,000, including a large portion for permanent improvements, it has taken in more than $23,000,000. The earnings of the new Department of Health, considered purely from the commercial standpoint, thus represent dividends of more than 766 per cent. in four years.

What is the value placed by the average citizen upon his children's lives—not the financial value estimated by the unemotional economist, but the worth in affection, good citizenship and in all that holds the social organization together? Is it good business policy to save the lives of children at $7 apiece? Is it paternalistic and socialistic to protect them against dangerous infections at the rate of $2 per head? That is what the State of Pennsylvania is doing now. This conservative old commonwealth has reached that stage of paternalism where the government will not sit quietly by and watch a little child choke to death with diphtheria when the expenditure of a few dollars from the public treasury will relieve its sufferings and save its life.

SAVING THE LITTLE ONES.

For the last ten years the practical remedy for diphtheria has been available for the children of prosperous households, but it has not been available for the poor. Since Von Behring's immortal discovery that the blood serum of a horse which has recovered from diphtheria possessed wonderful curative properties, and when introduced into the human organism, would usually destroy the disease, this former scourge of childhood has lost nearly all its terrors. In the old days diphtheria destroyed nearly one-half of all the children it assailed. It would do the same to-day among the poor in Pennsylvania were it not for the antitoxin which the State provides free.

That large numbers of unprotected children have died most shocking deaths in the past for the sole reason that the parents were too poor to afford them anti-toxin, is a melancholy reflection, but these things will not happen in the future. In every corner of Pennsylvania, usually at well known drug stores, there are now stations for the free distribution of anti-toxin, numbering 650. Whenever any poor man's child falls ills with diphtheria, his physician by making out a proper application, can secure free all the anti-toxin he needs to effect a cure.

Since October, 1905, the Health Department has in this way distributed 49,443 packages of anti-toxin. It has treated 19,929 sick people, mostly children, who, but for the State's intervention, would have been neglected. In the old days about 10,000 of these children would have died; as a matter of fact only 1,725 died. Nearly all those who died were children who did not receive the anti-toxin until the late stages of the disease. The detailed statistics of the department show that the earlier the sick child receives the anti-toxin, the greater his chances of recovery. These facts should emphasize the pressing need, in all cases, not only of antitoxin treatment, but of this treatment at the earliest possible time. The department has also thoroughly tested the powers of anti-toxin as an immunizing agent. Diphtheria, as every one knows, is one of the most virulently contagious diseases. It travels like lightning from the sick to the well. In the crowded homes of the poor, many of them ideal culture tubes for the growth of the microbes, its virulence is especially marked. The department in three years has immunized with anti-toxin 14,527 persons, nearly all children, who had been exposed to the disease. Of these only 251 acquired it—a little more than one per cent. The State Department of Health's free distribution of anti-toxin to the poor, therefore, has saved over 8,000 lives at an average cost of seven dollars each and prevented contagion in several thousands of cases at an average cost of two dollars.

WAR AGAINST TUBERCULOSIS.

In its attitude towards the great problem of tuberculosis, the State government also shows this keen sense of responsibility for the safety of the people. The Department of Health regards all the tuberculosis poor as in a large sense the wards of the State. Its efforts, in the first place, are to prevent them from falling victims to this insidious disease, and in the second, to assist materially in curing those who have become infected.

The death rate from tuberculosis in this State has fallen from 134 to 120 per one thousand of population in four years. This means a saving of 1,000 lives annually.

In the matter of tuberculosis, however, the death rate tells only a small part of the story. Any work in improving conditions must be fundamental, and it will necessarily take many years before extensive results are obtained. What the department has done has been to lay the foundation of comprehensive attack. From its laboratory investigations of the tubercle bacillus to its especially equipped sanatoria, there is no aspect of the disease that it does not study and combat. It aims to enter at every stage into the life of the tubeculosis poor. To many citizens the State government is more or less of an indefinite idea; they seldom come into contact with it as a living, acting entity; if you are once stricken with tuberculosis, however, especially if you are poor, the commonwealth of Pennsylvania becomes physically manifest in your daily lives. In the medical inspection, in the physician and in the nurses the State ceases to be an economic abstraction and becomes a kind, helping, fostering personality.

THE DISPENSARIES

If you are stricken down and cannot afford proper medical attendance, there is always near at hand a free tuberculosis dispensary, established for precisely cases of this kind. There are many thousands of patients in the State who are still able to be about and to follow the daily routine, perhaps even to support their families. The 114 tuberculosis dispensaries are of especial assistance to this class. The dispensary physicians have treated 21,227 patients and actually cured 712, while the condition of 2,649 has so greatly improved that the arrest of the disease is almost assured. Here the sick man or woman is received by a professional nurse, who makes a complete first-hand investigation of the case. By questioning the patient she learns all the details of his family history, his occupation, his financial resources, his surroundings, at home or at work—the latter particularly for the purpose of protecting his intimates and associates from infection. This information she records for the use of the physician, and the department. She follows up this preliminary talk by an inspection at the patient's home. Here her ministrations amount to a liberal education in the treatment of tuberculosis. She instructs the patient as to the proper handling of himself—how he must dress, how he must eat and sleep, and tells him of the well known ways of building up the natural resistance of his body. She also advises all the other members of the household how to escape infection—frequently discovers some members in the early stages of the disease and is thus able to ward it off. The nurse devotes particular attention to diet—nutrition being generally recognized as one of the predominating factors in strengthening the body's defenses. She tells the housewife what to cook and how to cook it. She inquires particularly whether there is a sufficient supply of fresh eggs and milk. Perhaps the family is too poor to supply the sick man with these necessities. In that event the State itself provides them. The dispensary nurses have made 133,444 visits of the kind described above.

LIFE AT MONT ALTO.

This, however, is only one department of this life-saving work. Any one who wishes a graphic idea of the State's sanatorium work should visit the tuberculosis colony at Mont Alto. Here, at an elevation of 1,600 feet above the sea, amid the breeze swept mountain pines, he will find nearly 800 men, women and children, under the care of physicians and nurses, bravely seeking to combat the disease in the fresh air and sunshine. Laboratory investigations have many times proved that the tubercle bacillus, once exposed to the light and air, shrivels up like a guilty thing and perishes; and the state, in this unique sanatorium, is giving its tuberculous poor their one great chance of overcoming the disease. This Mont Alto site is situated in the midst of a State forest reservation of 5,500 acres. It is high, cool, dry, with an abundance of fresh spring water, tillable soil upon which many of the household supplies can be raised, and all the attractions of nature to make pleasant and peaceful the lives of the patients. There is a village of specially constructed cottages in which the incipient cases live, and a large, well equipped hospital building for the advanced cases. At this sanatorium Pennsylvania has treated up to December 31, 1909, 2,365 patients, a large number of whom have been permanently cured and a still larger number so effectually strengthened that they are in far better condition than formerly to fight the disease.

Ground is now being cleared for a second State sanatorium on the beautiful site at Cresson, which Mr. Carnegie has so generously given to the commonwealth, and a third site has been selected in the foot hills of the Blue mountains, near Hamburg, in the eastern end of the State.

FOR PURE WATER.

In fighting such a widely prevalent disease as typhoid fever, the usefulness of a central State health organization is especially demonstrated. Against typhoid a local board is practically helpless. This is because the chief sources of infection are the water courses. Our rivers unfortunately do not recognize State or county lines. A municipality may prevent water pollution from the banks within its own jurisdiction, but cannot prevent it in other sections. Pittsburg may stop its own citizens from sewering into the streams, but she cannot stop other communities from polluting the waters from which she draws her own supply. And the discouraging fact is that, while one town may refrain from polluting the stream so that another further down may not have to drink its filth, its own water supply may be polluted by less conscientious neighbors living up-stream. Up to the year 1905 man in Pennsylvania appeared to have lost the natural instincts of the lower animals and seemed indifferent to the danger of loading his system with that which nature had once thrown off as poison. Unlike the beasts of the field, he had taken on the habit of discharging his offal into the streams from which he took his drinking water. Only some central body, which has absolute control over all water courses, can accomplish a general purification of the streams.

The Legislature recognized this necessity for central control when, in 1905, it placed all water courses, so far as public sanitation was concerned, under the jurisdiction of the Governor, Attorney General and Commissioner of Health. But there are also other private sources of pollution—especially the old-fashioned privies and wells which are still found in large numbers, overflowing into streams. These the department of health has now the power to abolish. The department has on file complete and detailed maps showing all the State's water courses, large and small. Whenever a case of typhoid fever is reported it can immediately put its finger on the water-shed where the disease originated and investigate accordingly. No municipality can now construct water works without first obtaining the State's approval of its plans. It cannot build sewerage plants without similar consent. Acting through these broad powers, the health department, through its army of inspectors, has penetrated the remotest recesses of the State, inspecting premises, noting palpable nuisances, investigating water and sewerage systems. A wholesome clean-up has ensued. In most cases the individuals and municipalities affected have realized the necessity of remedial measures and have accepted the work in a proper spirit. Up to date it has inspected 256,628 premises in rural districts and caused the abatement of 18,945 pollutions. It has issued 204 decrees requiring changes in public water works. Under its advice and suggestion, all over the State, cities and municipal bodies have awakened and voluntarily begun to improve their water supplies. Under the supervision of the department sixty-seven sewage disposal plants and thirty-five water filter plants have been built or are now under construction. Many of these municipalities have expended large sums of money in this work of protecting their citizens against those diseases which result from the use of impure water and are deserving of all praise.

TYPHOID CUT DOWN.

The purification of the State's drinking water is a large task and will take many years, but already the improvements have cut the typhoid death rate in half. In 1906, 56.5 out of every 100,000 people died from this disease; in 1907, 50.3; in 1908, 34.4, and in 1909, 23.9. That is there are now living 2,363 people who, had the death rate of 1906 prevailed in 1909, would have died.

Enough has been said to demonstrate that Pennsylvania's citizens have been made richer in health, happiness and industrial vigor and the State rendered more attractive, both for residential and manufacturing purposes and for the mere joy of life, by the application of the grand health laws of 1905.

You cannot capitalize human tears and mental anguish.

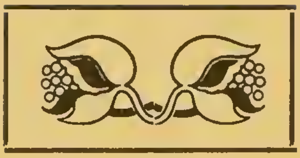
You cannot estimate in dollars the world's loss through the pessimism engendered by premature death, disease or the despair of poverty, which may follow both.

You cannot compute even the principal of the debt laid upon individuals, communities or states by the moral delinquencies that result absolutely from physical suffering alone.

But we can rejoice when we know beyond all doubt that in every year untimely death has been shut out of more than 8,000 of our homes and that at least 50,000 of our people are annually spared the ravages of acute diseases.

And with a pride blended with thankfulness we can rejoice in the spirit of Pennsylvania's fostering care for her people which made these results possible.

Looking backward upon the past few years we must acknowledge that whatever Pennsylvania has accomplished in advancing the cause of public health has only been possible through the loyalty and encouragement of the pulpit, the press, the Legislature, the Executive, the civic and philanthropic organizations, and indeed all the good people of the Commonwealth, who always stand ready to favor and fight for the common good.



Pennsylvania

Health Bulletin

No. 10. HARRISBURG, PA. April, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE BIOLOGICAL TREATMENT OF TUBERCULOSIS AS CONDUCTED BY THE DEPARTMENT.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 10. HARRISBURG, PA. April, 1910.

Entered as Second Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Biological Treatment of Tuberculosis as Conducted by the Department.

In the great work which has devolved upon the Department of Health of Pennsylvania by the appropriation by the State Legislature of a large sum of money to fight Tuberculosis in this Commonwealth, the question of treatment must play as considerable a part as that of prophylaxis. With our present knowledge of the use and value of serums and vaccines every effort must be made to obtain a product which will be serviceable in this chronic inflammatory affection the satisfactory treatment of which by means of specific preparations has so far baffled scientific investigation.

Twenty years ago it was my good fortune to make the discovery that avirulent and atypical tubercle bacilli when taken into the animal body disappeared and gave rise to a more ore less marked resistence to the tubercular infection on the part of the animal thus treated. I also determined the fact that if living tubercles were washed with a solvent which would soften their waxy capsule and then exposed to the action of normal salt solution, a product resulted which was toxic in certain doses, but which when given in more minute doses repeatedly, produced a more or less marked resistance to subsequent infection with virulent tubercle bacilli. These discoveries were published at the time and reprints were widely distributed among the medical profession both in this country and in Europe.

Following up this early work, which has never been discontinued by myself, the Laboratories of the Department of Health are now producing two products comparable to those described which should have a similar action, while, at the same time, they are harmless when used with reasonable precautions.

---

*Medical News, Philadelphia, October 19, 1889. "Possibility of Establishing Tolerance for the Tubercle Bacilli."

*Medical News, January 17, 1891—"Fluid of Dixon."

The place of the avirulent and atypical organisms mentioned above is taken by organisms which have been subjected to prolonged treatment with alcohol and ether, thereby removing a large part of the wax but leaving the body of the organism which produces the endotoxin. By the use of this vaccine it is hoped to obtain a resistance to the bacteria themselves, i. e. an immunity to tuberculosis.

The second product is made by washing living virulent tubercle bacilli in ether, drying them and then shaking them in normal salt solution for a definite number of hours, after which they are allowed to stand a definite time longer without mechanical agitation. This suspension is then passed several times through porcelain filters. The resulting filtrate is a clear straw-colored fluid which is shown both by microscopical and by animal injection tests to be wholly free from tubercle bacilli. The strength of this solution is designated as 10 per cent., by which is meant that every gram of tubercle bacilli has been treated with ten grams of salt solution. The solution is diluted in order to furnish appropriate doses.

The precautions used in preparing these products render any contamination impossible, but, as an additional safeguard, one-half per cent. of Carbolic Acid is added to prevent subsequent infection. Every sample of the products is controlled by animal experiments, and tuberculosis has never resulted from their use. The syringes in which the products are supplied are incubated at body temperature for at least 48 hours, and any showing mould or other growth are excluded.

These products are toxic in that an increase of temperature will follow their introduction into a tuberculous individual. No such rise of temperature will follow an injection in a healthy individual. Small animals will stand repeated injections of .000001 gram of the organisms which have been treated with alcohol and ether, or a quantity of the salt solution extract of the living bacilli which equals the extraction of .001 gram. Large doses of either preparation will cause a rapid loss of weight and even death in a tuberculous guinea pig.

To the Medical Staff of the Department:

Gentlemen: In the use of the Suspension of Dead Tubercle Bacilli and Tubercle Bacilli Extract for the treatment of tuberculosis by cell immunization, the patients should be carefully selected, as my preparations are not supposed to be of value in all cases. The best results are to be expected in patients who have a small amount of tissue involvement and in which the body cells have not become saturated with the toxin. To-day I am pursuing exactly the same principle of treatment with the dead bacilli in place of the involution forms as I did in 1889, *i. e.* with small graduated doses with a progressive increase of strength to produce, by degrees, an increased power of the tissues to resist the action of the tubercle bacilli. During the early use of all preparations made directly from tubercle bacilli some of the medical profession made grave mistakes, and by administering large and too frequent doses they killed the tissues, and often caused general tuberculosis. In this way a hypersusceptibility was maintained at all times.

THESE PRODUCTS ARE PREPARED IN THE FOLLOWING STRENGTHS.

SUSPENSION OF DEAD TUBERCLE BACILLI.

Dilution No. 1, containing one one-thousandth of a milligram (0.000,001 gram) of dead tubercle bacilli.

Dilution No. 2, containing one one-hundredth of a milligram (0,000,01 gram) of dead tubercle bacilli.

Dilution No. 3, containing two one-hundredths of a milligram (0.000,02 gram) of dead tubercle bacilli.

Dilution No. 4, containing three one-hundredths of a milligram (0.000,03 gram) of dead tubercle bacilli.

Dilution No. 5, containing four one-hundredths of a milligram (0.000,04 gram) of dead tubercle bacilli.

Dilution No. 6, containing five one-hundredths of a milligram (0.000,05 gram) of dead tubercle bacilli.

Dilution No. 7, containing six one-hundredths of a milligram (0.000,06 gram) of dead tubercle bacilli.

Dilution No. 8, containing seven one-hundredths of a milligram (0.000,07 gram) of dead tubercle bacilli.

Dilution No. 9, containing eight one-hundredths of a milligram (0.000,08 gram) of dead tubercle bacilli.

Dilution No. 10, containing nine one-hundredths of a milligram (0.000,09 gram) of dead tubercle bacilli.

TUBERCLE BACILLI EXTRACT.

Dilution No. 1, containing the extract from one milligram (0.001 gram) of tubercle bacilli.

Dilution No. 2, containing the extract from ten milligrams (0.01 gram) of tubercle bacilli.

Dilution No. 3, containing the extract from twenty milligrams (0.02 gram) of tubercle bacilli.

Dilution No. 4, containing the extract from thirty milligrams (0.03 gram) of tubercle bacilli.

Dilution No. 5, containing the extract from forty milligrams (0.04 gram) of tubercle bacilli.

Dilution No. 6, containing the extract from fifty milligrams (0.05 gram) of tubercle bacilli.

Dilution No. 7, containing the extract from sixty milligrams (0.06 gram) of tubercle bacilli.

Dilution No. 8, containing the extract from seventy milligrams (0.07 gram) of tubercle bacilli.

Dilution No. 9, containing the extract from eighty milligrams (0.08 gram) of tubercle bacilli.

Dilution No. 10, containing the extract from ninety milligrams (0.09 gram) of tubercle bacilli.

DOSAGE.

Each dose of the various dilutions is supplied in a syringe ready for direct injection, and contains the strengths as above indicated. You should begin with Dilution No. 1 of the Suspension of Dead Tubercle Bacilli (0.000,001 gram) or the Tubercle Bacilli Extract (0.001 gram). This injection may be repeated at five-day intervals and if after five injections there is very little or no reaction, the treatment with No. 2—Suspension of Dead Tubercle Bacilli (0.000,01 gram) or Tubercle Bacilli Extract (0.01 gram), should be undertaken. If after five injections at five-day intervals this should not produce any material reaction, a series of five injections of No. 3—,Suspension of Dead Tubercle Bacilli (0.000,02 gram), or Tubercle Bacilli Extract (0.02 gram), can be given; then No. 4,—Suspension of Dead Tubercle Bacilli (0.000,03 gram), or Tubercle Bacilli Extract (0.03 gram); following then with No. 5, Suspension of Dead Tubercle Bacilli (0.000,04 gram)—and so on up to strength No. 10, watching, of course, for a reaction which should govern the treatments subsequent to No. 5.

The physician-in-charge should use his judgment as to how the patient feels in general, depending, of course, upon the manifestations of each one's condition as to the strength, the weight, the sleep, the circulation, the appetite, the cough and the temperature. When these are good, the patient presents a good picture along the line of recovery, and moderate reaction may be tolerated. It should be the aim of the physician administering the treatment to increase the dosage with such care as not to produce a severe reaction during the entire time of treatment. However, if a severe reaction should occur, it is advisable to return to the next, or possibly even the second weaker dilution.

SAMUEL G. DIXON,
Commissioner.

P4164

Pennsylvania
Health Bulletin

No. 11. HARRISBURG, PA. MAY, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

Stanford University Library
JUL 8 1910

WITHDRAWN

THE BUBONIC PLAGUE, ITS ORIGIN, PROGRESS AND MEANS OF PREVENTION.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 11. HARRISBURG, PA. May, 1910

Entered as Second-Class Matter, August, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Bubonic Plague, Its Origin, Progress and Means of Prevention.

A plague is a wide-spread, virulent, epidemic disease. One disease of this nature is however so pre-eminent above all others in point of malignity, destructiveness and horror that by common consent it has obtained the designation of "The Plague." This word signifies a "stroke" and is a survival in our language of the belief of a superstitious age that an epidemic is the "stroke of God," the conscious vengeance of an angry deity.

It has been denominated the "Oriental Plague" because it has always originated in the East; the "Egyptian Plague" because in the eighteenth century and early part of the nineteenth it prevailed extensively in Egypt; the "Levantine Plague" because it raged in all cities of the Levant, and finally, the "Bubonic Plague," because one of its most marked characteristics is the appearance of glandular swellings or buboes in various parts of the bodies of its victims.

It is the most fatal of all known acute diseases. At an extremely moderate estimate more than eighty out of every hundred stricken with it die. That this statement is conservative will be seen when it is stated that in India, during the fourteen years, ending with December, 1907, out of 6,842,980 cases, 5,571,288 died.

The disease has never been known on the Atlantic coast of the United States nor until very recently on the Pacific coast. Since 1894, however, at which time it was limited to the province of Yunnan, China, it has been steadily travelling toward this country in both directions. While in 1894-95 it was confined to one country, within six years it has reached every continent and obtained a foothold in fifty-one different states. Of these, two are dependencies of the United States, Hawaii and the Philippine Islands, and two are in the United States, California (San Francisco, Oakland, Berkley and

Point Richmond) and Washington (Seattle). It has twice gained a footing in San Francisco and only by the most persistent effort and unstinted use of money has it been stamped out. Our increasingly frequent communication with the Orient makes us constantly liable to its introduction.

It is not too soon therefore for us to be taking it very seriously in order that we may be ready to crush out the first spark of the conflagration the moment that it appears.

THE PLAGUE IN THE UNITED STATES.

The reports of the United States Public Health Service show that the presence of plague in San Francisco was first discovered in the year 1900. Owing to the unwise policy of concealment at first adopted by the state authorities, at the instance of the commercial interests of the city, the infection obtained so firm a hold that although sounder counsels afterwards prevailed, and the intervention of the United States was cordially invited, the state, city and national authorities working in entire harmony, it required four years of incessant labor to stamp it out. During that period 119 cases occurred with 113 deaths. This sufficiently indicates the virulent character of the epidemic. Hopes were entertained that the disease had been definitely banished from the continent but these, like many other hopes, were shattered by the earthquake in 1906. Probably owing to the fact that plague-infected rats in vast numbers were then driven from their nests and took refuge with the people in the temporary shacks in which they took shelter, the disease appeared again in 1907, and continued up to the middle of the year 1908. In this second outbreak 159 cases were reported with 77 deaths, a very gratifying reduction of mortality. In the mean time however occasional cases of the disease had made their appearance in other municipalities and in the rural districts, and investigation disclosed the fast that not only plague infected rats could be found in those districts but also plague infected ground squirrels. This introduced a new element of danger, and the authorities both state and national at once took the alarm and are fighting the danger vigorously. Rat fleas have been found on ground squirrels and conversely squirrel fleas have been found on rats. Thus, unless the ground squirrels are destroyed they will always be liable to re-infect the city rats, and thus be a constant and terrible menace to the health of the cities. Moreover the ease with which the brown rat (Mus Norvegicus), travels, concealing itself in merchandise in cars, makes the appearance of plague infected rats on this side of the rocky mountains only a question of time unless the work of their destruction is carried on untiringly and relentlessly.

The well established fact of the annual loss of millions of dollars to the country by the destructive properties of these animals, which will thus be prevented, makes it worse than folly to speak of expense as an obstacle to this operation. There is indeed no more effective measure of economy. All of the five varieties of rat fleas and two varieties of squirrel fleas bite human beings greedily.

Soon after the appearance of the disease in San Francisco in 1907 no less than three cases were discovered in Seattle, Washington. Prompt measures in the United States Public Health Service seconded by the city Commissioner of Health have however prevented any further spread notwithstanding the favoring conditions owing to the houses being almost entirely of wood. The last plague infected rat was discovered September 26, 1908.

Officers engaged in the work of rat destruction in California and Washington report that there are three methods all of which must be pursued in order to attain extermination. These in the order of their importance, although not of period of adoption, are:

1. The destruction of the nests.
2. The deprivation of food.
3. The killing of the rats themselves.

In the immediate presence of an epidemic, the last named should take the precedence. The means for this are traps and poisons.

Rats can be deprived of much food by strictly covering up every particle of refuse matter, protecting chickens and pigeons from their attacks, and rat-proofing granaries and store houses of all kinds.

Their nests can be broken up by tearing up floors, passage ways, cellars, piles of rubbish, lumber, scrap iron and other refuges and destroying old deserted buildings and shacks, followed by the free use of cement or concrete to render the basements, cellars and walls of all buildings absolutely rat proof. Strong galvanized wire netting of one-half inch mesh is also an effective obstacle to their entrance. With the disappearance of rats, rat fleas also vanish from a community.

The rat can be, to use an expressive recent phrase, "built out of existence," as is being done in San Francisco, but only a few people have sufficient intelligence and public spirit to do their part in this movement except under compulsion. Therefore we must have laws governing the careless harboring of the rat.

A city garbage dump always affords food for rats and on that account alone should never be allowed to exist. Garbage incinerators should be universally established.

CHARACTER OF THE DISEASE.

Plague is an acute, febrile, infectious disease, characterized by a tendency to buboes or suppurating lymphatic glands and carbuncular swellings in various parts of the body, especially the groins, axillae and neck, accompanied by marked cerebral and vascular disturbances and intense nervous prostration. In a relatively small number of cases the lungs are the principle seat of attack, constituting the pneumonic type. There is also a mild, ambulant type which is excessively dangerous to the commuity because it may easily be concealed. The course of the disease is however rapid as a rule, death often occurring in forty-eight hours.

MODE OF COMMUNICATION.

It has been proven beyond a peradventure that the usual mode of its transmission from one human being to another is the bite of a certain species of fleas which infest rats but which, when the rat dies, may find refuge in the hair of other animals. One of these fleas biting a plague patient or an infected rat, or other animal, takes the bacillus of the disease into its own body and infects the next person whom it bites. This discovery not only throws a flood of light on many obscure problems in connection with the travels of the disease, but also affords a key to the means to be adopted to prevent its entrance into the State.

The pneumonic cases however are directly contagious and highly so.

Experimentally the bacillus has been communicated to guinea pigs through the medium of bed-bugs and lice.

The epizootic in rats usually precedes the epidemic in human beings for ten days or two weeks, and this warning should never be neglected.

In order to determine the diagnosis in rats which appear sick, it is not necessary to waste time in waiting for the development of a culture of the bacillus. The Indian Plague Commission of Great Britain has demonstrated unqestionably that the lesions of the plague in rats are easily recognized by the naked eye. These are buboes, subcutaneous extravasations, granular liver, pleural effusions and a large firm spleen. A diagnosis on these grounds is fully as trustworthy as one founded on bacillary findings.

In a report on "The Evidence of Plague Infection among Ground Squirrels," published in "Public Health Reports," January 14, 1910, Dr. McCoy says, "The disease is attended by definite lesions in every case. I have come to the conclusion that the naked-eye examination alone will always afford one ample grounds upon which to base a probable diagnosis, and no case has come under observation in which infection was detected in an animal that failed to present microscopical evidence of the disease."

METHODS OF PREVENTION.

MEASURES NECESSARY AT PORTS OF ENTRY.

First—Quarantine of all persons and vessels arriving from infected ports or countries must be rigidly enforced. The period of incubation is from two to six days. For quarantine purposes it must be considered seven days from date of last exposure. Persons detained must be carefully examined twice daily by the quarantine physician and their temperatures taken. A rise of temperature should be the signal for immediate isolation, the adoption of all precautionary measures, and the microscopic examination of discharges and sputa.

Second—Rat exclusion. Vessels in quarantine must be compelled to anchor in the stream at least a third of a mile from the shore. The cargo must be removed on lighters. When empty the vessel must be thoroughly and simultaneously fumigated from stem to stern with sulphur, a waterguard having been placed around it to destroy escaping rats. All places where dead rats are found should be drenched with boiling water or an insecticide solution fatal to fleas.

PRECAUTIONS IN INFECTED TOWNS.

Waste no time in a general cleaning up of the town as that will do no manner of good. When there is a serious reason to fear an invasion of plague the hospital for communicable diseases or a special hospital designated for plague patients only must be rendered rat proof and flea proof. This is an excellent precaution for any hospital at any time, and the expense entailed will not be thrown away even if the plague should not become epidemic. A house of detention, of large dimensions must also be provided for suspects.

The utmost care must be taken in the collection and disposal of garbage. Nothing must be left exposed on which rats can feed unless it has been poisoned. Rat-proof cans must be used for the reception of all such waste either in houses or markets. Extermination of rats, mice and ground-squirrels must be systematically prosecuted on the largest possible scale. These animals must be examined bacteriologically for the *bacillus pestis* and also for fleas.

Boards of Health in exposed situations should provide themselves in advance with Haffkine's prophylactic fluid and Yersin's antipest serum.

PRELIMINARY PRECAUTION IN TOWNS.

Patients must be immediately removed to hospital. The home must be entirely vacated, disinfected and fumigated, and rat extermination must be promptly set on foot. Contacts must be removed to a house of detention and kept under medical observation for the full period of incubation.

Any place or building in which infected rats are found must be disinfected and fumigated, or, if possible destroyed, by fire.

There must be a post-mortem and bacteriological examination of every person dying under suspicious circumstances. No one must be allowed to go barefoot. Shoes must be rubbed with coil-oil every day.

INSTRUCTIONS FOR NURSES AND ATTENDANTS.

Patients must be stripped immediately on admission; if men, they must be shaved, and in either sex the hair must be cropped close to the head. They must then be bathed with hot water and soap, particular attention being given to portions of the body which are apt to harbor vermin. The clothing should at once be immersed in crude coal oil. Any fleas which come to the surface should be captured for examination. All discharges of the patient contain the *bacillus pestis*. They must therefore be received at once into a disinfectant solution, five per cent. carbolic acid, three to five per cent. formalin, or two per cent. tricresol; sputa and nasal discharges must be received on cloths which should be burned. The same is true of the pus from discharging buboes. The body and hands of the patient must be sponged at least three times daily with a solution of bichloride of mercury, 1-1000.

All utensils used by the patient must be disinfected with the same solution, which should also be used with a mop on all surfaces in the sick room.

Owing to the method of communication, nurses and attendants run very little risk except in pneumonic cases, but attendants having scratches or cuts on their hands should protect them with rubber gloves and frequently apply the bichloride solution to the wounds.

No uncooked food should be used and meals should be eaten while still hot.

Boiled water must be used both for drinking and washing.

The room must be screened from flies. Bed and body clothing must be at once immersed in bichloride solution and allowed to soak for one hour before removal from the room.

The floors must be rubbed with crude coal oil once every day and the attendants must rub their shoes and sprinkle their stockings with the same. Leggings must be constantly worn and similarly sprinkled. The ground close up to the walls of the hospital and for a distance of twenty feet outside must be sprayed with coal-oil.

ADDENDUM.

At certain European ports, notably Hamburg, plague infected vessels are treated by sealing the hatches and filling the hold and saturating the cargo with carbon monoxid, in order to kill the rats. This is done in the stream. They are then brought to the wharf and the cargo discharged after which the hull is disinfected with sulphurous acid fumes (sulphur dioxid). It should be borne in mind however that not only is carbon monoxid one of the deadliest poisons, but that it is extremely inflammable and explosive, so that unless excessive care is used the danger of the destruction of the vessel is great. Nocht and Giemsa claim that they have devised a generator which develops from ground coke a dry gas containing at least two parts $C\,O_2$, to one part $C\,O$, which is non explosive and non inflammable. Its average composition is said to be

$C\,O$,	4.95 vol per cent.
$C\,O_2$,	18. vol per cent.
N,	77.05 vol per cent.

This they assert can neither burn nor support combustion. It is promptly destructive to rats, but is not a disinfectant or insecticide. Its employment necessitates a skilled staff and the constant presence of a physician.

Pennsylvania

Health Bulletin

No. 12. HARRISBURG, PA. JUNE, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

JUL
1910

WITHDRAWN

A RETROSPECTIVE GLANCE.

1. SUSCEPTIBILITY TO TUBERCULOSIS.
2. PURITY OF MILK.
3. BOVINE TUBERCULOSIS.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 12. HARRISBURG, PA. JUNE, 1910

Entered as Second-Class Matter, August, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

A Retrospective Glance.

It is a law of nature that every wave must have its reflux.

This is as true in the world of mind as well as of matter. When an opinion which has long been universally entertained is upset by some great discovery, the trend of thought always rushes to the other extreme.

Hence, when Koch's great discovery of the bacillus of tuberculosis showed the fallacy of the belief that that disease necessarily descended from parent to child, people immediately hastened to adopt the opposite theory that ancestry had nothing whatever to do with it, and from this to conclude that there was no reason why the children of tuberculous parents should be considered more liable to develop the disease than others.

There could not have been a more unfortunate deduction, and many children have been unnecessarily exposed and are still being exposed to the infection whose inherited tendenceies make them especially liable to cultivate the germ. It will therefore be expedient to cast a retrospective glance over the field, and the following excerpts will aid us in so doing.

1. Susceptibility to Tuberculosis.

Extracts from the Annual Address before the State Board of Health of Pennsylvania, for the year 1891:

"It would appear from what has been said that it is probable that man, when in a certain condition, is susceptible to tuberculosis infection when exposed to the *materics morbi,* and that it may make its entrance into the animal economy either through the stomach, the mucous membrane of the digestive or respiratory tracts or through the abraded skin; and, further, that man is constantly exposed to the toxic agent, and yet all men are not affected with tuberculosis.

"I have little or no doubt that all of you can remember instances when men have been severely exposed to tuberculous material and yet have lived to a good old age untainted with the disease, while others who have been in all probability but slightly exposed have taken the infection.

"This special susceptibility demonstrates that some must furnish a suitable soil and that in such cases the affinity of the constituents of the tissues must be weak and thus enable the toxic agent to break it up and pass through the process of tuberculosis.

"This condition we must admit is often hereditary. We have seen very many instances of members of the same family, living in different and far distant localities who have at a certain age succumbed to tuberculosis.

"We cannot explain all the inherited factors, yet we can readily conceive mere abnormal and inconsistent proportions of the viscera as being a predisposing cause; a mere mechanical course pursued by the air passages, weak cilia in the air passages, digestive glands that secrete a weak gastric juice, papilli of the intestinal canal incompetent to make a proper selection of food, or a weak phagocytic power may each afford a cause for susceptibility.

"There is certainly inherited not only a tendency to contract, but a marked readiness to yield to an attack.

"Hereditary predisposition is often intensified by intermarriage. If we find in the bovine fetus tubercle, we have an heirship.

"The parent in this case certainly, to say the least, bequeaths to its offspring that which it actually possesses.

"After an experience of breeding over a hundred animals, I am convinced that interbreeding intensifies either strong or weak characteristics. However this predisposition only furnishes a soil or habitat for that material so universallly found in tuberculosis.

"A predisposition in man can also be cultivated. Vitiated air is one potent cause; under this condition the blood is not properly oxidized; therefore the digestive function becomes impaired, the tissue weakens and susceptibility is acquired.

"Prebreathed air or house air, with a lack of physical exercise, is responsible for much tuberculosis acquired by man, not only directly, but also indirectly, by rendering the cattle he eats predisposed to tuberculosis.

"Active ventilation in our dwellings and public buildings, factories, and mills, etc., is essential for the prevention of the disease.

"We have no scientific proof that foul air in any way nourishes the tubercle bacillus or that it increases its virulence, yet we do know that it reduces the resisting power of the animal economy, and that a lack of a free interchange of air permits of an accumulation of the bacilli.

"For instance, if 10,000 bacilli are given off into 1,000 cubic feet of air, there would be ten bacilli in each cubic foot of air breathed; whereas, if the interchange of air furnished 10,000 cubic feet in the same length of time, each cubic foot of air inspired would only contain one bacillus.

"Laboratory experimentation proves beyond doubt that the quantity of tuberculous material taken into the animal economy decidedly affects the rate of mortality. This fact is entirely consistent with the well authenticated statistics showing a much larger mortality in crowded places and goes to establish the absolute necessity of interspace ventilation to prevent the spread of tuberculosis.

This being the case, it goes without saying that the ventilation of the streets and air spaces of cities, towns, etc., is also necessary to maintain the health of inhabitants.

"Statistics show that in proportion as people are attracted to indoor occupations and in proportion to the degree of closeness from want of proper ventilation of the buildings in which they work, in that rate is the ratio of deaths from tuberculosis increased.

"While there is nothing that affects the wealth and happiness of the people of this great State more than ill-health, and while there is no one poison that interferes more with health than tuberculosis, which not only too often robs us of those in the prime of manhood and womanhood, but renders thousands upon thousands a burden to themselves and their families for years, yet it is, happily, a preventable disease, and this Board should be armed with authority and means to enforce and carry out sanitary laws essential to that end.

"To accomplish this most important work it must be evident, after what we have reviewed this evening, that you should have legislation regarding the disinfection and destruction of tuberculous material, especially human tuberculous sputum.

"There should be a law compelling passenger transportation companies to furnish receptacles containing either water or a germicide for sputum, both in their cars and stations. The same law should apply to all places where large numbers of persons gather together either for the purpose of work or amusement.

"To enforce the expulsion of dust in our factories and workshops.

"To compel the thorough sprinkling of the public highways immediately before cleaning.

"To forbid spitting on the sidewalks.

"The width of all new streets and passageways should be of a sufficient breadth. Every block of buildings should have a complementary garden or park. Every building should be accompanied by a certain air space.

"Such topographical regulations must be insisted upon in our growing cities, if we mean to reduce the present alarming death-rate and suffering from phthisis.

"This ventilation of our cities and towns by the laying out of wide and diagonal streets and reservations of open spaces for gardens and parks, is essential for the successful ventilation of our buildings.

"A pure and constantly renewed atmosphere is requisite for the prevention of consumption. This is well known and universally admitted beyond doubt or controversy.

"Dentists and physicians should be required to disinfect their instruments according to a law of the State, and be subject to inspection and a heavy fine for a violation of the same.

"The cleansing of all public conveyances should be regulated by law.

"We should have laws regulating the ventilation of our animal stables. Cows, like men, require physical exercise and pure air and light to enable them to resist tuberculosis.

"The hot, close, dark and dirty stables throughout our State are important factors in promoting tuberculosis in our cattle; therefore, regulations should be formulated for ventilation, light and cleanliness of animal sheds and stables. These should be under the inspection of competent and honorable inspectors.

"Soiling of cattle should be forbidden by law."

2. The Purity of Milk. Extracts from a paper read before the Pennsylvania Horticultural Society, Philadelphia, March 19, 1895.

"While the germs of scarlet fever, diphtheria and typhoid fever are said to be, and undoubtedly frequently are, transmitted to the human economy through the agency of cow's milk, these disease-producing micro-organisms are generally believed to have gained access to the milk from some other source than the cow itself; for instance, from the air, water or surroundings of the stable, or from the attendants. On the other hand, however, during the present crusade against cow's milk, some would have us believe that the organisms of tuberculosis come, in almost every case, directly from the bovine mother. This present popular and exaggerated teaching is doing much harm.

"Consumers of milk are stopped from the free use of that most important of foods in consequence of which artificial food preparations, such as are advertised in our leading medical and other journals as being superior to the food provided by mother Nature herself are resorted to by the unfortunate mothers who cannot or will not themselves secrete the natural nourishment for their offspring.

"Many of these artificial foods are pernicious, for, though they are fattening and deceptive, they in many instances fall short of supplying the necessary elements combined in a way satisfactory to a normal metabolism. Many of the children fed on these mixtures become rickety, and others grow up to maturity only to be long sufferers from chronic diseases or to readily fall victims to pathogenic micro-organisms. The chemist frequently leads us astray by making the unqualified statement that such and such laboratory productions are in formula exactly the same as some of the products of the great laboratory of Nature, though the latter has, I say, a factor which no other has, and one as yet not well understood by man, viz., *life*. Identical chemical formulas do not necessarily indicate that the respective substances have the same food value, for though the ordinary chemist will tell you that citric acid and lemon juice are practically alike, we know from experience that they are not. Nature has differentiated between them, and a so-called lemonade made from the artificially prepared citric acid will often cause gastro-intestinal irritation, where the real lemonade will not. Other similar illustrations will serve to convey my idea as to the danger of relying upon chemical analyses alone in determining the value of artificial food-stuffs and should be borne in mind by every physician, mother and nurse.

"But I am here this evening, as I have been elsewhere before, to deny the semi-popular notion that all consumption in the human family come from the bovine race or cow. Rarely, if ever, do the tubercle bacilli find their way into the milk from a consumptive cow unless she has tuberculosis of the milk glands; and in connection with this statement I have reason to believe that only about 2 2-5 per cent. of tuberculous cows have such mammary tuberculosis. If this be so, we should not allow our attention to be diverted from other and more fertile sources from which the tubercle bacilli may find their way into the milk. For example: consider the probability that there may be a greater number of consumptive milkmaids or milkmen and attendants about a dairy than of cows with tuberculous udders, since only 2 2-5 per cent. of all consumptive cows are in such condition, while nearly one-seventh of all human deaths occur from tuberculosis; and then picture to yourselves an attendant, well advanced in pulmonary consumption, poverty-stricken, careless and uncleanly as regards his clothing and person, who not only scatters thousands upon thousands of the bacilli by expectoration upon the hay, bedding, and all about the stables and dairy, but even transfers the germs from his unwashed hands directly to the milk pail. Other ways by which the organisms might find their way into the milk before its delivery to the consumer will readily occur to you; but while I fully appreciate the great importance of having milk from healthy animals, the above will suffice to show you why I do not believe in straining at gnats and swallowing camels.

"The vessels for keeping and conveying the milk to consumers should be thoroughly cleansed, scalded and exposed to sunlight and air each time after use. The separate jar system requires special care in this respect, for the jars are frequently carried into sick-rooms where the patients may be ill with scarlet fever or other infectious diseases, and may be returned to the milkman and thence to the dairy without having been properly sterilized, after which, if not sterilized by the dairyman, they may serve to carry the infection to other families or children. I might here suggest the delivery of milk in jars so cheap that they could be destroyed or discarded immediately after use; such jars, I should think, might be made and furnished to dairymen in quantities for a fraction of a cent apiece. However, unsterilized jars are a danger only when the milkmen are ignorant and careless, and of such let us hope there are few."

3. Bovine Tuberculosis.

The Royal Commission by King Edward Seventh to inquire into the relations of Human and Animal Tuberculosis said in its partial report of January 1, 1907:

"One factor determining the amount of disease produced is the dose, that is to say, the number of bacilli injected. But in some instances the same quantity of the same emulsion or culture presumably containing about the same number of bacilli injected in the same way into two animals of about the same size and age, produced in one animal a much greater effect than in the other. This we attribute to the former animal being more 'susceptible' to the bacillus, the tissues having less power of 'resistance' than in the latter animal. Hence, it is not the absolute dose, the absolute number of bacilli, which supplies a determining factor, but the dose in relation to the susceptibility of the animal."

The report of this commission must be considered as having *settled affirmatively so far as the practical application of our knowledge is concerned, the question of the interchangeability of the bovine and the human tubercle bacillus, and of the possibility and even frequency of the transmission of the bovine bacillus to the human being through the alimentary tract, especially in infancy.* The fact that the majority of cases of tuberculosis in early childhood result from the use of milk containing tubercle bacilli can no longer be called in question.

"So far therefore from Koch's discovery leading us to disregard the question of heredity in the transmission of tuberculosis, it should cause us to be even more on our guard than before. We should appreciate the importance of such training and regime of the child whose family history leads to suspicion or who itself displays those physical traits which have always been considered as indicating the consumptive or strumous tendency, as will strengthen the resistive power of the tissues.

"We should be careful not to unnecessarily expose such children to the danger of infection either through food, more especially milk, or through direct communication with consumptives. Moreover we should bear in mind that there are certain forms of predisposition as for instance anatomical variations, which give no external evidence and therefore however robust a child may appear we should never needlessly throw it in harm's way. All of us must remember cases in which persons exhibiting every indication of vigorous health have succumbed to the infection."

SAMUEL G. DIXON.

Pennsylvania Health Bulletin

No. 13. HARRISBURG, PA. JULY, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

EXPERIMENTS ON TUBERCLE BACILLI, OLD TUBERCULIN AND THE FLUID OF DIXON.

LABORATORY OF THE STATE DEPARTMENT
OF HEALTH.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 13. HARRISBURG, PA. JULY, 1910

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Experiments on Tubercle Bacilli, Old Tuberculin and the Fluid of Dixon.

Laboratory of the State Department of Health.

NOTE ON THE STAINING PROPERTIES OF DEGREASED TUBERCLE BACILLI.

The study represented in this paper was carried out as a side issue to our work on the wax and fat of the tubercle bacillus which substances we have been extracting as nearly intact as is possible to obtain them by solvents acting upon the organisms. Therefore the degreased tubercle bacilli mentioned in the title were really but imperfectly degreased. So far as the percentage of hydrocarbon compounds obtained is concerned, extraction by alcohol followed by pertoleum-ether yielded the highest, but this seems to have very little effect upon the morphology and tinctorial properties of the bacilli. The technic used in our work follows:

Technic.

The tubercle bacillary mass was obtained from moderately virulent, adult, human bouillon cultures, which we filtered through sterile paper covered by a sterile sheet and allowed to drain over night. While the mass was still moist, smears were made using a minimum of albumen water to make the organisms stick to the slide. The mass still in the paper was placed in a drying oven with H_2SO_4 and allowed to remain until the mass was thoroughly dry and dark brown.

---

*This solution is made from living organisms. They are removed from the culture medium, without any treatment whatever, to water and washed. The water is then drained off and they are washed in ether for six hours. They are then dried to their previous consistency. The tubercle bacillary mass is then suspended in 90 parts of weight of .85% salt solution, shaken in a machine 8 hours, allowed to stand 16 hours at room temperature and then filtered through a close Berkefeld candle. The resulting fluid is pale amber and constitutes the tubercle bacillus extract of "Fluid of Dixon."

It was then finally pulverized and slide preparations were made as before. The mass was then placed in a soxhlet apparatus and degreased by the various solvents employed for our work in obtaining the hydrocarbon components of the tubercle bacilli. At the completion of the extraction, which lasted from 135 to 155 hours running time, the bacillary powder was thoroughly air dried and the last set of preparations made. One set of extractions was made with living organisms while in another we used cultures killed by heat in the autoclave before filtration.

We therefore had for the experiments, the following extractions:

Living and Dead bacilli extracted by ether alone, 95 per cent. alcohol followed by benzol and 95 per cent. alcohol followed by petroleum ether (benzin).

The preparations were fixed by heat (except when method of staining contraindicated the same), stained and decolorized as follows:

Stain.	Decolorize.	Counterstain.
(a) Carbol Fuchsin,	5% $NA OH$,	
(b) Carbol Fuchsin,	Absolute alcohol,	
(c) Carbol Fuchsin,	5% $H Cl$ in 95% alc.,	
(d) Carbol Fuchsin,	20% $H NO_3$ in 95% alc.,	
(e) Carbol Fuchsin,	20% $H_2 SO_4$ in abs. alc.,	
(f) Carbol Fuchsin,	5% $H Cl$ in 95% alc.,	Hematoxylon.
(g) Carbol Fuchsin,	5% $H Cl$ in 95% alc.,	Methylene Blue.
(h) Gram's Stain (prolonged),		Dilute fuchsin.
(j) Loeffler's Methylene Blue,		
(k) Iron hematoxylin (Mallory),		
(l) Polychrome Methylene Blue (Wright),		

All sets were carried out simultaneously with fresh solutions.

A study of the notes of the individuals sets of slides to be found at the end of the paper shows us that the moist and dry controls did not vary greatly except in the character of the granulations. Why the granules should be clearer in the dry bacilli is not easy to decide unless one assumes the old and somewhat discredited spore formation theory. They do not have the appearance of any recognized spore. With the Gram stain, the blue granules are quite clear in the moist bacilli, while, after drying, solidly staining rods are more common.

After degreasing by all methods, two changes are noticeable. The first is a heaping up of acid-fast material at the ends of the bacilli with a paler area in the centre. The second is a general paleness of staining with very shadowy outlines somewhat "moth eaten" along the edge and without any clumps or beads of deeply staining material. The first noted change is more often seen after degreasing with alcohol, ether and benzol, while benzin-extracted organisms more commonly show the second form. This is however not absolute. In both changes the bacilli are noticeably more slender. I do not find differences between bacilli living and dead before beginning extraction of sufficient regularly to warrant any definite statements. All preparations of extracted organisms show a semi-acid-fast film in which the bacilli are lying. Gram stain of degreased bodies gives practically the same result as before extraction. All the bodies are clear. The granules are *not* more deeply stained.

It is noteworthy that degreasing of the bacilli permits of more diffuse staining by Loeffler's solution and iron hematoxylin and that granules are not stained. This latter stain has chief affinity for nucleins. This stain and the polychrome methylene blue do not give preparations at all regular and, with the exception of the observation on the absence of iron hematoxylin granules, may be discarded. The technic was that of Mallory, exactly followed and with repeated precipitation, so that had any affinity existed between bacillary components and the hematoxylin it should have shown in the acid granules so frequently seen in other preparations by the same extraction processes.

The question of the granules deserves some special mention particularly in the light of the recent work of Much upon the non-acid-fast, gram-staining tubercle bacillus granules. Deycke (Munich Med. Woch March 11, 110) explains these granules as the seat of proteins taking the Gram-stain but somewhat resistent to it by reason of neutral fats presents in them, to which latter bodies he further attributes the natural resistance of the tubercle bacillus to destruction by outside influences. The acid-fastness he says is due to fat acids. The granules resist antiformin but since they are not acid-fast, they must contain some fat body to resist this solvent. The only body to resist this is neutral fat. He therefore indirectly claims that the granules are the resistant stage of the tubercle bacillus (spores?) The process he describes takes place in the animal body where it may be produced by many substances among which lecithins are not to be forgotten. By our methods in vitro certainly great parts of the neutral fats would be removed. Various authors give the percentages of hydro-carbon for the tubercle bacillus from 5 to 40 per cent. In our work the extactions varied from 17 to 26 per cent. Petroleum ether attacks neutral fats readily.

Despite this theory of Deycke, the protein showing stains, i. e. methlyene blue, hematoxylin alone and with iron, did not show any greater staining deposits with treated than with control bacteria. We have seen in our laboratory the taking of anilin dyes by the tubercle bacillus in preparations made from open tuberculous abscesses. The action of a lecithin in vitro has a somewhat similar action. These studies by Mr. Garcia will follow this paper.

(a) Carbol Fuschsin. Decolorized by 5 per cent NA OH. When moist all organisms take stain deeply with rather hazy outlines. The ends are clubbed and rounded. After drying they tend to become somewhat beaded but are deeply and completely stained. Smears made after degreasing show a field strewn with filmy streaks or veils of amorphous pink material in which the bacteria may be seen. There are many shadow forms with bodies stained as before treatment, with gradation of staining intensity between. These latter show chiefly thick, well-stained, possibly clubbed ends with clear areas in the centre of the bacillary body or beneath the faintly suggestive capsule. This seemed to be absent in the organisms after degreasing with alcohol and petroleum ether. The bacteria are all surrounded by a halo which separates them from the amorphous pink material. The organisms are throughout much thinner than controls. Beading is inconspicuous.

(b) C. F. Stain, decolorized by absolute alcohol. In the control preparations, when moist one sees clear, sharply-outlined, irregular, typical forms. Some are fairly granular but the granules are much clearer after drying. Treatment by ether and alcohol and alcohol-benzol method results in long thin rods with fairly well-staining, beaded ends, but a rarified, very thin, central portion. These rods lie in the amorphous filmy pink substance. The living bacilli show more granular forms, while those degreased after killing by heat are very much paler and contain fewer granules. There are more shadow forms in the latter. Many but not all are surrounded by an unstained halo.

(c) C. F. Stain, decolorized by 5 per cent. hydrochloric in 95 per cent. alcohol. The observations on this means of staining and decolorizing are practically identical with those on the preceding method. The bacilli perhaps stain somewhat more clearly, but the characters are almost identical. (Notes made by two observers independently).

(d) C. F. Stain, decolorized by 20 per cent. H. NO 3 in 95 per cent. alcohol. In the preparation from living Tubercle bacilli, the bacteria are less strongly beaded but the granulations do not stain sharply. From dead organisms one sees short, thick, faintly but more diffusely stained rods. After degreasing the living bodies preparations show faintly-staining, short rods, with *obscure* beading and much unstained protoplasm between. The dead bodies show irregularly staining rods with scarcely determinable outline. Some have dark grounds, others are entirely homogeneous pale pink. The amorphous pink haze is extremely pale.

(e) C. F. Stain, decolorized by 20 per cent. H2 SO4 in 95 per cent alcohol. By this stain one sees thin, faintly-beaded, well stained bacteria when made from the moist mass, while when dried they are deeply stained with prominent beading. The bacteria are very uniform in appearance with this stain after all methods of degreasing. The beads or granules stand out faintly but clearly against an almost decolorized body substance about which the capsule is practically absent.

(f) C. F. Stain, decolorized 5 per cent. H Cl in 95 per cent. alcohol counterstained by hematoxylin.

There is no difference between the results obtained by this method and method (c). No bacillus was found taking the basic stain.

(g) C. F. Stain, decolorized 5 per cent. H Cl in 95 per cent. alcohol counterstained by methylene blue.

Here too we have the same result as in control methods (c).

(h) Gram stain.

By this stain the moist forms show as long beaded rods in which the beads take an intense blue color while the intermediate parts take a pale pink violet color. There are also many solid Gram-positive forms. The dried bacilli are similar but there are proportionately more solid, heavy Gram-positive ones. These characters apply to both living and dead tubercle masses. There are also in some wholly gram-negative individuals. The outlines are quite clear.

After degreasing it is quite difficult to differentiate the various preparations. The living organisms when degreased tend to be more beaded and less uniformly Gram-positive, while the preparations of dead forms seem more regularly blue and homogeneous. These observations are however, not decisive. The outlines are quite clear.

(j) Löfler's methylene blue.

The observations on this method of staining permit of no contrasts and may be summed up in a few words. The controls of moist and dried living and dead organisms show irregularly staining, pale, "moth eaten" forms with no distinguishable outlines. After degreasing there seems to be more diffusion of the stain throughout the bacillus body, granules being diffuse and obscure and the capsule sharper.

(k) Iron hematoxylin.

The only differences noticeable in these preparations is that, after degreasing, the organisms take the pale brown stain somewhat more evenly and clearly and perhaps the edges are a trifle more distinct.

(l) Polychrome methylene blue (Wright's).

The living and dead moist and dried organisms all stain very irregularly by this method and no distinct differences could be detected. The bodies consisted variously of solid pale purple rods or more deeply staining rows of granules like closely applied streptococci. They were for the most part well outlined. After degreasing, the rods lose practically all granulation but do not stain regularly. The centre is apt to be thinner and more palely stained than the ends; sometimes other portions may be unstained.

NOTE ON THE MORPHOLOGICAL VARIATIONS OF THE TUBERCLE BACILLUS IN TUBERCULOUS ABSCESS.

The following observations were made upon tubercle bacilli in the caseo-purulent material of a subcutaneous abscess following an injection of sputum by this route. They are of interest because of the changes in the tubercle bacilli as compared with the foregoing article upon changes after degreasing. While the resulting forms are not strictly the same, the part played by the granules is noteworthy. Throughout all preparations they are prominent and do not at any time disappear, although in some of the smears near the end of the observations, very few whole rods are discernible. They may be seen crowding a cell space in which nuclei and apparently most of the protoplasm have disappeared.

Technic: A tuberculous sputum was injected subcutaneously into guinea pigs. This was followed by an abscess formation in the anterior abdominal wall, eleven days after the injection.

At the first examination of the purulent material made eleven days after the injection, the tubercle bacillus was found in the pus, first sparsely and then gradually increasing in abundance. Different stages of phagocytosis were observed, in some instances as many as 20 bacilli being found in a single leucocyte with a tendency to the disappearance of the nuclear structure in the leucocytes (figure 1).

After three weeks, phagocytosis very marked with a slight diminution of the organisms in the pus. The morphology of tubercle bacillus presented two distinct types:

1. Normal tubercle bacilli in majority.

2. Thick and short tubercle bacilli with marked granulation at the ends. (Figure 2).

There were also found clumping and grouping of tubercle bacilli in large masses, deeply stained with fuchsin, irregularly swollen, resembling tubercle bacilli when treated with ether (Figure 2).

After one month, tubercle bacilli were abundantly found but showing degeneration; five types could be distinguished.

1. Swollen, curved, thick and irregular in outline without granulation.

2. Tubercle bacilli, long with marked granulation, presenting a regular beaded appearance.

3. Long bacilli with irregular granulations, some of which resemble spores.

4. Bacilli with marked granulation at one end, resembling tetanus bacilli in appearance.

5. Double club-shaped, united by a thin protoplasmic filament, resembling the form first described by Dixon as involution forms. No distinct branching could be determined. (Figure 3).

After five weeks, round masses of tuberculous material were found resembling what is described as "Schrön's capsule," presenting the following characteristics:

1. Small round masses consisting of typical acid fast tubercle bacilli.
2. Small round masses consisting of acid-fast, homogeneously stained structure beset with acid-fast dark stained granules.
3. Homogeneous masses irregularly stained, varying from a deep red to a purple color.
4. Very large masses with clear, faintly reddish stained centre and markedly granular at the periphery. (Figure 4.)

After six to seven weeks, tubercle bacilli sparsely found, very slender forms, irregular in outline and in process of marked disintegration. Organisms gradually disappearing from the preparation, only two being found on one slide after a search of twenty minutes.

Staining. Preparations were made as usual on slides dried and fixed by heat, stained with carbol fuchsin, first decolorized by 25 per cent. sulphuric acid, then with equal parts of 25 per cent. sulphuric acid and absolute alcohol and finally with absolute alcohol. They were then washed in water and counterstained with methylene blue. Each step in decolorization lasted but a few seconds.

Between the third and fourth observations recorded above some of this caseous matter was injected into the peritoneum of other guinea pigs to demonstrate if possible change of virulence with change of type. This series shows nothing as yet. The tubercle bacillus growth from this set of guinea pigs is of moderate virulence and grows well on egg media.

EFFECT OF REPEATED INJECTIONS OF KOCH'S OLD TUBERCULIN INTO HEALTHY COWS. II.

In 1908 an observation on cows repeatedly injected with Koch's Old Tuberculin disclosed the fact that minute focal necroses occurred in the spleen, and to a less extent in the lymph nodes of the animals injected, but three times.

Starting with the result of our first experiment in mind, this work was planned so as to give the toxin a greater chance to act upon the lymphatic organs. Three healthy dry cows were tested with the usual dose of Old Tuberculin (400 mg) without reaction.

---

*Medical News, Oct. 19, 1889.

Then from January to October 1909, two of them received twenty-one (21) bi-weekly doses of Old Tuberculin subcutaneously and were killed two weeks after the last dose.

We had for a few weeks in our stable some infected cows and the animals of this experiment were apparently infected from them. They were not infected at the start and of course did not show any reaction during their treatment. The control cow was in such fine condition that she was not retested before killing, because we did not wish to have the effect upon the viscera of a recent injection of tuberculin. At autopsy all were found to have active lesions, but those of the control were very many fewer and less active than those of the two injected cattle. We regret that the accident spoiled our pathological work but the result has one pointer. It would seem from the condition of the treated and untreated animals that the former were more sensitive to the infection, if one can judge by the character and spread of the lesions. There is undoubtedly greater activity in the tuberculous process of the treated animals than in those of the control and while individual receptivity may have played some part, one cannot help suspecting, with all three under identical conditions, that the numerous doses of 400 mgs. of tuberculin actually increased the susceptibility of the cows to the existing infective agent. If this assumption be true, repeated testing of a herd containing suspected cattle *may* not be an unmixed blessing, and frequent testing may be positively dangerous. There follow abbreviated autopsy protocols.

Cow No. 12. Control received only one testing dose, 400 mg.

Killed Oct. 29. The cow was in excellent condition, fat was abundant. Cervical, retropharyngeal, and submaxillary glands slightly enlarged and firm; no visible tubercles. Section homogeneous, follicles faintly visible. Superior and anterior mediastinal and bronchial glands enlarged, firm, beset with firm homogeneous fibro-caseous nodules, varying from a few millimeters to 2 centimeters. The long posterior mediastinal gland shows a well marked follicular border, some of the follicles having such dense centers that they seem to be pale, diffuse tubercles. The lungs and bronchi are free, except at one point in the right lung where there is a slight peribronchial infiltration about the size and shape of a medium lima bean. The mesenteric glands are small, soft, homogeneous in consistency, with pigmented medulla and pale cortex of irregular width. This is also true of the glands in the lesser omentum, although the latter seem slightly enlarged. One mesenteric and one lesser omentum gland contain some nodules with central calcareous deposits. One retro-peritoneal gland beside the kidney contains a slightly diffuse tubercle. The organs except as mentioned, seem normal.

Prescapular gland normal. Homogeneous follicular border faintly, ill-defined against medulla. Supramammary glands similar.

Cow No. 13. Received 21 biweekly injections 400 mg.

Killed Oct. 29, 1909. Cow well preserved and in good condition. The submaxillary and retropharyngeal glands are enlarged, firm, homogeneous in consistency, with no defined follicular border, no tuberculous change. The cervical, superior, anterior, bronchial and posterior mediastinal glands show progressive caseous nodules from pea to cherry size, without any appearance of resistance in the form of connective tissue. The centers are quite soft. The parts of the glands not affected are pale, opaque, homogeneous and chylous. The lungs show large caseous areas scattered irregularly through the tissue; in one place there is a slight cavity formation. The intervening lung tissue is pale, in some places, tending to be emphysematous. The liver contains a few small sharply outlined precasous tubercles about 2 millimeters across, the spleen is free and appears normal.

Kidney normal. Gastro-intestinal tract normal. The mesenteric glands; two glands were found containing small precaseous nodules about 5 millimeters across. The rest show a pale irregular follicular border with pigmented chylous medullae. Glands in the lesser omentum enlarged and contain several small precaseous tubercles. Prescapulars and supramammary apparently normal.

Cow No. 14. Received 21 biweekly injections of 400 mg.

Killed Oct. 29, 1909. Animal in excellent condition. Submaxillary and retropharyngeal glands enlarged, soft, homogeneous. No tubercles. Cervical similar. In the superior mediastinum there is a large caseous mass extending around the great vessels down to the bifurcation of the trachea and anteriorly almost to the sternum, involving all the glands and areolar tissue. The center is entirely destroyed and almost liquid. The trachea and lungs seem free, except for a small caseous area in the upper lobe of the right lung which lies against and is slightly adherent to the mass in the mediastinum. The posterior mediastinal glands show some precaseous tubercles along the follicular border with pigmented medulla. The liver is normal. Spleen and kidney normal. Gastro-intestinal tract normal. Mesenteric glands show several large caseous nodules averaging 5 millimeters. Those free from caseous nodules show hyperplastic follicular borders. In the lesser omentum the glands contain many small caseous nodules. Prescapular and supramammary similar. Pigmented medulla with diffuse; the follicles cannot be seen as discrete bodies.

Histologically the tissues of these three animals are not very different. They all show a very marked follicular and diffuse lymphadenitis. The lymph glands of the thoracic cavity tend to be solidly lymphoid, while the abdominal glands show quite active large-lymph-cell centers in the follicles. All lymph structures, that is, spleen, lymph nodes and intravisceral lymph collections show similar changes. There is a moderate endothelial hyperplasia in all the spleens and in some of the mesenteric glands; this is however, much more prominent in Cows 13 and 14, which received the tuberculin. As noted before in our experiments with tuberculinized normal animals, small necroses occur chiefly in the endothelial follicular centers, but also in collections of these cells about blood spaces in the pulp. Similar necroses are found in this series of cows, and are more prominent in the spleens of the treated animals. They are however, not entirely missing from the sections of spleen of Cow No. 12 the control animal, but here they are almost entirely around the blood spaces of vessels and seem in some instances to have been preceded by oedema.

The miscroscopic appearance of the tuberculous lesions is practically the same in all sections. There is no greater necrosis on the one hand or fibrous tissue formation on the other, in those animals which received tuberculin. The effect of natural infection of cows is evidently somewhat different from the picture seen in artificially infected guinea pigs treated with tuberculin. In the latter case, necrosis soon follows both endothelial hyperplasia and typical tubercle formation. In the cows of this experiment we do not find central follicular endothelial hyperplasia shortly followed by total necrosis and the collection of leucocytes and the formation of new connective tissue. The other organs showed a slight fatty metamorphosis. No epithelial hyperplasia was observed.

EXPERIMENT DEMONSTRATING THE STABILITY OF "THE FLUID OF DIXON,"* (TUBERCLE BACILLUS EXTRACT NO. 10).

It is a well known fact that old tuberculin deteriorates when kept in solution. The stability of the crude material may be due to the glycerine content but some change undoubtedly occurs when a dilution is made in physiological salt solution for injection purposes. The demonstration of this is difficult because the degeneration may not be sufficient to prevent some reaction in a tuberculous animal. To determine this point with regard to tubercle bacillus extract† a series of tuberculous guinea pigs was injected with it, fresh and diluted. They reacted with the customary irregularity of this animal although every one gave some response. We then decided to try the effect of large doses of various ages both concentrated and in dilution in salt solution kept in the ice box. For this purpose a series of guinea pigs was injected with a fixed quantity of tubercle bacilli from a culture whose virulence-dosage-time was well known. At the end of two weeks they received the toxic injection, using a quantity of tubercle bacillus extract equivalent to 200 mgs. of the dead bacilli. The material had been prepared a week in advance in a carefully marked series of test tubes and kept in the ice box. Doses of the fluid were measured off, some in concentrated form, others so diluted as to make a convenient dose equal 200 mgs. The accompanying chart illustrates the experiment representing pure and diluted batches of this form of tuberculin of varying ages.

---

*Medical News, Jan. 17, 1891.

Number.	T.Bc. 3 15-10.	4 1-10 Toxins.	Life period.	Average.
1	.01 mg. 1 A Bov.,	Control no toxin,	7 d. Enteritis,	------
2	.01 mg. 1 A Bov.,	Control no toxin,	26 d.,	------
3	.01 mg. 1 A Bov.,	Batch No. 5, 11 mos. old. Pure, 200 mg.,	25 d.,	26.5
4	.01 mg. 1 A Bov.,	Batch No. 5, 11 mos. old. Pure, 200 mg.,	28 d.,	------
5	.01 mg. 1 A Bov.,	Batch No. 5, 11 mos. old, dil. in s. s. 1 wk. in refrigerator. 200 mg.	23 d.,	------
6	.01 mg. 1 A Bov.,	Batch No. 5, 11 mos. old, dil. in s. s. 1 wk. in refrigerator. 200 mg.	23 d.,	23.
7	.01 mg. 1 A Bov.,	Batch No. 6, 5 mos. old. Pure, 200 mg.,	34 d.,	------
8	.01 mg. 1 A Bov.,	Batch No. 6, 5 mos. old. Pure, 200 mg.,	31 d.,	32.5
9	.01 mg. 1 A Bov.,	Batch No. 6, 5 mos. old, diluted in s. s. 1 wk. in refrigerator. 200 mg.	20 d.,	20.
10	.01 mg. 1 A Bov.,	No second injection, died 13th day,	T.Bc. miliary,	------
11	.01 mg. 1 A Bov.,	Batch No. 7, 1 wk. old. Pure, 200 mg.,	28 d.,	------
12	.01 mg. 1 A Bov.,	Batch No. 7, 1 wk. old. Pure, 200 mg.,	29 d.,	28.5
13	.01 mg. 1 A Bov.,	Batch No. 7, 1 wk. old, diluted in s. s. 1 wk. in refrigerator. 200 mg.	22 d.,	22.
14	.01 mg. 1 A Bov.,	No second injection, died 6th, enteritis,	------	------

At the end of the week in the ice box the dilutions were sterile by culture.

This experiment does not show any result which could assist in forming an opinion of the toxicity of No. 10. It does however, show a difference between the toxicity of concentrated and diluted extract, despite the loss of two animals before the second injection. The average life period of six tuberculous guinea pigs injected with pure No. 10 is 29 days while in those receiving diluted toxin this period for 4 guinea pigs is only 22 days. The age of the respective batches seems to have little effect.

When diagnosing a morbid fluid for tuberculosis by injecting guinea pigs it has been our routine to treat these animals with 250 mgs. of old tuberculin, 10 days or 2 weeks after the suspected material is given. If the animal be tuberculous there is a congestion at the site of original inoculation and at the second site. Around the former, tubercle bacilli may then be found in considerable numbers. Although the animals were not killed for this purpose in the experiment we are reporting, a careful watch was kept upon the site of original tubercle bacillus inoculation. No local reactions whatever occurred.

It is therefore evident from this experiment that tubercle bacillus extract not only does not undergo specific deterioration by age or dilutions, when kept in the cold but may actually be slightly more toxic to infected guinea pigs. There is however no local reaction and tubercle bacilli do not tend to become active in any subcutaneous lesion. The controls died of generalized tuberculosis strictly comparable to the treated animals. [No. 1 had a few scattered miliary tubercles. No. 10 had general miliary tuberculosis while No. 14 had enteritis and some early caseous nodules.]

Pennsylvania Health Bulletin

No. 14. HARRISBURG, PA. AUGUST, 1910

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE CONSERVATION OF CHILD LIFE IN PENNSYLVANIA.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 14. HARRISBURG, PA. August, 1910.

Entered as Second Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Conservation of Child Life in Pennsylvania.

When the problem of the conservation of our national resources was being so prominently brought to the front by fore-seeing and far-seeing statesmen, some time ago, the writer asked a United States Senator this question, For whom are the forest, coal and mineral rights being protected? The answer was "For future generations." Then he was tempted to ask further, Why is the United States Government making such strenuous efforts for the preservation of all those natural resources when she is comparatively neglecting to preserve the health of their acknowledged recipient—man.

Is it to the credit of our intelligence as a people that while we give the guarding of material interests our best thought and energy we should allow man himself, without whom all else is worthless, to be neglected?

Consider for a moment how different is the attention which we give to the protection and development of our domestic animals. All the problems connected with this important subject are studied by experts at the Government's expense, and immense sums are apppropriated for the purpose. To reply to this interrogatory that human beings are possessed of reason and are therefore able to protect their own health and direct the development of their offspring is to fly in the face of all experience. The moment that the advancement of so-called material interests is found to be antagonistic to the maintenance of a high standard of human health, the former, in the estimation of the average citizen, is given the right of the road.

On the other hand, so thorough and comprehensive is the work done to conserve the lower animal life in a high state of perfection that individuals suffering from any chronic disease are never kept for stock purposes. The health of the mother is seduously cared for in order that the embryonic life may normally develop, and the moment this becomes an independent body, if, for example it be a thoroughbred colt, it is brought up, regardless of expense, in the way it should live to promote its very best development. Its stable is kept clean and well ventilated. Its food is of the best and is carefully measured out, and its thirst is quenched only with pure water. It is given proper physical exercise. It is educated to obey its caretaker. It is not permitted to come in contact with animals suffering from skin disease, glanders or other communicable disease. Its education and its occupation in life are adjusted in proportion to its natural abilities. If the colt is bred from Shire stock it is taught to do draught work. If it comes from old trotting stock and shows good action and plenty of nerve it is broken for a trotting life. If it is a thoroughbred and runs low, quick, and shows endurance and nerve, it is educated for a runner.

Now this naturally leads up to the question—"What are we doing for the healthful development of our people?" To begin with, are we doing anything to prevent the chronic sick from marrying? We cannot ignore the fact that the factors influencing the happiness and welfare of mankind make some questions very complex. Sentiment is one which is hard to deal with and one which should be most delicately handled. Without it man's happiness would be greatly discounted. The public health authorities have not taken care of and cannot take care of the embryonic life except through broad educational work.

The greater responsibility, therefore, for pre-natal care rests upon the high schools, colleges and the medical professors, as it devolves upon them to educate their advanced students along this most important line of study.

The physical development of the child depends upon the family physician, the parents or the guardian, and the school teachers. Escape from communicable diseases rests largely upon the medical profession and the municipal and state departments of health.

The child, like the colt, should first be made an obedient, healthy animal, and then his mental education should be advisedly undertaken. The school room, as well as the stable, should be well ventilated and intelligently lighted. The mental training should invariably give way to the preservation of health. Too often when I was a member of the Board of Public Education has a teacher called my attention to her pet—the brightest child in the school,—a poorly nourished, anaemic little girl standing at the head of her class, soon to fall a victim to disease or to grow up without sufficient strength to make use of her natural abilities and education. I am often asked "Is there no law to prevent a tuberculous child from going to school?" My only answer as yet must be—"Yes, the law of nature and human kindness."

Within the last three years I delivered an address in which I censured parents and teachers for pushing mental education beyond the physical strength. The newspapers published what I said. Shortly after the publication a friend happened into my office, saying as he stretched out his trembling hand—"You hit me hard, you hit me hard." I was worried and perplexed until he added "I lost my son. He was doing so well at college I thought he could pull through until vacation when he was to take a long sea trip, but I kept him at it too long."

Now, the family physician and the teacher could often save a sad instance like that. Enthusiastic teachers, however, often make the same mistake that the ambitious parent does and could sometimes join with the parent and say, in harmony with his remorseful utterance, "I kept him at it too long."

Boys, like colts, should be educated to fill the positions in life they are fitted for both mentally and physically. A delicate boy should be educated for a vocation fitting his condition

The horse-breeder who should train a heavy Shire colt for the racecourse would not commit a more laughable, or perhaps I should rather say pitable, error than the educator who endeavors to stock the mind of a boy whose whole brain is alive with the stirrings of mechanical invention with Latin roots, or the mother who condemns a girl whose ear has no natural perception of harmony to six hours daily drudgery at the piano, while possessing talents of the highest order when it comes to that most important vocation of all—the training of a family. But not only should discretion be used in the selection of an occupation for the growing citizen, founded on his or her natural tastes and capacities, but education should be conducted on lines calculated to develop the body coördinately with the mind. If a child who learns easily and is ambitious to take a high standing in his studies, is found to be losing flesh, vitality and color, the alarm should be at once taken and that child should be "put out to pasture," taken away from its too absorbing studies, and set to work on a farm, until the proper balance between vegetative and intellectual and emotional life is re-established and it is safe for the mental training of the young animal to be resumed. When the medical adviser of the parents observes such a condition gradually stealing on a child it should be his duty, even at the risk of incurring parental displeasure, to urge such a course most earnestly. Nor on the other hand can he view with complacency the present craze for competitive school and college athletics, in which the heart of the growing boy is too often taxed far beyond the capacity of its constituent muscles. How many physical wrecks are doing half a man's work on the stage of life owing to disablement on the foot-ball field and the arena, and how many more occupy unnoticed graves stricken down by heart failure just at a time of life when they should be doing their best work for their families and for the State.

The family physician, while ever ready to acknowledge the value of the assistance given him by the specialist and expert, should not allow his hold on his families to slip from his grasp. He should make good his claim to be something more than the family prescriber in case of illness. He should study the temperaments, constitutions and capabilities of the children over whose entrance to the field of life he presides and cultivate their friendship and confidence. He should make himself so essential as an advisor and mentor to the parents that they would not think of taking any serious step in the education and development of their offspring without first consulting him.

With this prelude I desire to offer a brief outline of what Pennsylvania is trying to do under her advanced laws to produce a healthier race of men and women, such as shall excel in the various paths of life, and to make our people stronger and happier and more successful producers, no matter what may be their calling in life, whether professional, mercantile or agricultural.

Beginning then with infancy, What is the Department doing toward the rearing of a race of vigorous healthy men and women in our land?

As soon as the child is born it becomes a ward of the State. A record of the event with the place and date and names of the parents and the attending physician with important information regarding antecedents is made at the State Capitol where it is stored away with such admirable precision that it can be referred to at a moment's notice a dozen or fifty years hence.

Recognizing the fact that the awful calamity of blindness blights many a life because of a preventable disease acquired in the process of birth, we have issued careful instructions to midwives, nurses and others who may be in attendance at that important epoch of existence for the proper treatment of the eyes of the newborn in all cases when they are threatened with inflammation until the services of a physician can be obtained.

With the object of protecting the health of the child we must in the first place use all the educational means in our power that the parents may be taught how to care for the rising generation from the very start.

We recognize as mediums of communication with the people at large four methods of publication. First, the daily press, through which we aim to address to the public, as often possibly as weekly, brief cautions and items of information, put in popular language and calculated to attract attention without being of a sensational character. This we consider a very valuable means of impressing the public. Second, circulars in which careful, precise instructions are contained for the guidance of nurses and other attendants on the sick. Third, bulletins, issued monthly, containing information of a more scientific character, designed for the information of physicians, county medical inspectors, health officers and sanitarians generally. The results of our research laboratory work are often given out in this way. Fourth, papers before the various Medical, Sanitary and Pharmaceutical Associations.

Thus we have recently addressed a leaflet, prepared under the supervision of one of the most prominent pediatrists in the State, entitled "Save the Babies." This treats briefly, in such simple language that any mother can understand it, the questions of boiled water, breast feeding, bottle feeding, bowel movements, vomiting, clothing, bathing, living in the fresh air and importance of consulting the physician in case of the appearance of a rash of any kind. From fifteen to twenty thousand of these were distributed early in the present heated season, in addition to their publication in five hundred newspapers which, of course, multiplied it many fold. The fact that they are constantly called for even beyond the limits of the State is a sufficient indication that they have reached their mark. Also in connection with hot weather, a bulletin entitled "The Disease Breeding Power of House-Flies and the Best Methods of Prevention" was given very wide circulation.

The protection of the child and thus of the whole population against the most awful of all scourges, Smallpox, by vaccination is in this State very properly confided to the educational authorities, our own Department simply providing the necessary literature.

Our circulars for the sanitary care and prevention of communicable diseases, designed principally for the protection of infant and child life number twelve. They include Typhoid Fever with the pregnant prefatory warning "Wipe out Typhoid Fever by Killing the Germs in the Bed-Pan," Diphtheria, Scarlet Fever, Epidemic Cerebro-Spinal Meningitis, Measles and German Measles, Whooping Cough, Mumps, Smallpox, Chickenpox, Pulmonary Tuberculosis, Directions for Room Disinfection and Instructions for the regulation of Quarantine, Isolation and Disinfection.

These are placed in the hands of our sixty-six county medical inspectors and seven hundred health officers for constant use as needed and also distributed in large numbers on every occasion of epidemic outbreak. It is at such times especially that it is possible to arrest the attention of parents and induce them to consider such subjects.

So the young citizen grows up fostered and protected by the State until it has reached the school age.

For many years after the idea of public health, or State medicine was conceived, it was considered that measures designed for the protection of the public at large—the people as a whole—were all that were necessary or even expedient. Then it began to be realized that a very important part of the population had a death rate all its own, namely the infants, and that if this enormous sacrifice of baby life was to be curtailed, special means must be adopted for their special protection. Furthermore those who were studying the training of our children became convinced that school children would be saved much sickness, as well as discomfort, if their surroundings while in school were made as healthful as possible In accordance with this thought every possible pains was taken to diminish sources of disease and ill health in and about schools, and, inasmuch as school directors do not always appreciate the necessity for modern improvements in such matters, it was found necessary to institute school inspection in which inquiry should be made as to the mode of construction, drainage, heating, lighting and ventilation of school houses, and other matters which more or less seriously affect the health of pupils. But it was still found that, with all the care in construction and management of the school houses, as soon as the children were called in from their vacations and crowded together in school rooms sickness began to develop among them, especially from such diseases as are generally called contagious or communicable. It was evident therefore that there was a direct connection between the assembling of the scholars and the increase of such affections, and while it might have been going too far to pronounce the schools "hot-beds of disease," as has been done, the situation was evidently serious enough to demand the adoption of some new method applicable to children of school age alone. At first the educational body resented the imputation that schools were a menace to the health of the pupils and therefore to that of the public. But little by little the pertinacity of doctors, health officers and sanitarians has had its effect, and educators have become educated to the point of admitting that there is room for improvement, and of accepting the Medical Inspection of School Children as a measure fraught with the greatest value to the rising generation.

This procedure, it will be noted, has nothing in common with the inspection of schools. A school, that is to say a school building, may be inspected by any person of average intelligence and education. A child can be inspected only by an educated physician. Hence the phrase "Medical Inspection of School Children."

But "Our children belong only to us," say some of the parents "to do as we please with them." "No," replies the Commonwealth, "they belong in part to you and in part to the whole people, and we, the people, do not intend either that they shall grow up in ignorance, or that their education shall be interfered with by your neglect to keep their bodies in sound condition so that they may profit by the instruction which we are providing for them. We require you to send your children to school for so many hours daily during so many months in each year and we expect you to exercise reasonable care in maintaining the health of your children, and especially in respect to such diseases as are liable to be conveyed to other children. As, however, the constant exercise of such care may be a burden and expense to you, we are willing to share it with you during the time that we are responsible for their care." This seems a fair statement of the case, and any parents who consider this provision an infringement on their liberties need to go to school themselves to learn the true meaning of the word liberty.

The investigations of our County Medical Inspectors and Health Officers soon developed the fact that throughout our rural districts the excellent laws which the legislators had provided for the construction and management of schools in the interest of the protection of the health of our school children were far more honored in the breach than in the observance. So serious were these conditions found to be that in 1908 the Department considered it its duty to inaugurate a system of sanitary inspection of school buildings through its health officers. The information thus obtained more than justified the step, and subsequent semi-annual inspections indicated that the school authorities were waking up to the necessity for more careful observance of the laws. In the meantime, however, such admirable results were found to be following the introduction of the medical inspection of school children in cities that the idea of its attempt in the country districts naturally suggested itself. Daily or even weekly inspection as practiced in cities was manifestly an absolute impossibility, but would it not be possible to accomplish much good by a less frequent examination of the children made at regular intervals? Especially did it appear that defects of vision and hearing, deformities, faulty nutrition, and incipient tuberculosis could in this way be detected in time to save much suffering, great waste of educational facilities and, indeed, many lives.

On careful deliberation it was decided therefore to place the supervision of the whole system of school inspection in the hands of the County Medical Inspectors and their deputies, including both sanitary inspection of buildings and grounds, and medical examination of the children. With this object in view the health officers, few of whom are physicians, were relieved of this duty and only physicians were entrusted with it.

The reports of inspections are made on score cards for the sake of economy of time, uniformity and conciseness. One of these is marked Sanitary Inspection, the other Physical Record. On the first is recorded the sanitary condition of the school rooms, grounds and outbuildings, including provisions for light, heat, ventilation, water supply and sanitary conveniences. On the second age and sex of the pupil, the condition of sight, hearing, respiration, skin, teeth, cervical glands, history of contagious diseases and existence of pulmonary tuberculosis and deformities. In recording deformities they are classified as those of the spine, the chest and the extremities. Those of the extremities are further described as congenital or acquired. Under the heading of skin diseases are noted pediculosis, scabies, ring-worm, impetigo contagiosa, favus, molluscum contagiosum and erysipelas.

Each eye is tested separately, using Snellen's chart at twenty feet, indicating the amount of vision as a fraction, the distance at which the child is standing, namely twenty feet being used as the numerator and the denominator being the size of type which the child is able to read at that distance. The presence of blepharitis, conjunctivitis, iritis or trachoma or any affection of the cornea is then noted. Care is taken that the children do not memorize the letters.

Each ear is likewise tested for accuracy of hearing, twenty feet being taken as the denominator while the distance at which the whispering is heard is taken for the numerator.

The presence of a discharge from either ear is then noted, and its nature.

Defective teeth and nasal breathing are noted. Enlargement of the cervical glands is looked for.

With regard to nervous conditions the existence of chorea or epilepsy is stated, and the general condition of nutrition.

If indications of present or recent contagious disease are found, note is made of the fact and the exclusion of the child and its brothers and sisters at once ordered.

Gentleness and tact are insisted on in the personal inspection so that its value may not be impaired by mental disturbance on the part of the child.

The medical inspector under no circumstances advises as to the selection of a physician nor does he communicate with the family of a pupil personally with regard to the results of the examination, all reports to the family being made directly from the Department.

The number of schools inspected in the spring of 1909 was 11,094. The number found in good condition was 364. The number inspected in the fall of the same year was 11,462, and the number found in good condition was 1,405; so that while the number inspected was only very slightly increased the number in good condition was nearly four times as large, indicating an immense improvement in the course of a few months as the results of a single inspection.

Should a communicable disease appear among the pupils of a school necessitating disinfection of the building our health officers, thoroughly instructed in all the details of the operation, are ready to step in at a moment's notice, cleanse and fumigate the building and render it safe for occupancy again at the earliest possible moment.

But not only at school but at home also does the State care for the health of the growing child. No article of food is so essential to its healthy development as milk. An important element of nutrition at all ages, it is especially so during early childhood, and we are endeavoring by a systematic inspection of the dairies of the State twice each year to bring about such changes in the management of the cows and the treatment and control of the dairy products, including transportation, handling and exposure by venders and in shops, that it shall no longer be the filthy, disease-breeding fluid that it too often is, but shall actually provide the rising generation with a pure and generous nourishment. This inspection is entrusted to our health officers and the reports are made upon a score card. They bring us information as to the condition of the stable and the barn yard, and the care of the animals.

In the Spring of 1909, the number of dairies inspected was 15,992. Out of this entire number only 3,212 were found to be in thoroughly satisfactory sanitary condition. In the spring of 1910, upwards of 50,000 dairies were inspected, but the tabulation of the reports has not yet been completed. The number of dairy premises on which typhoid fever was reported as having been present during the year was 99. The number on which Scarlet Fever was reported for the same period was 71. The number on which diarrheal conditions were found was 5.

Next to pure milk nothing is more essential to the healthy growth of a child than pure water. Mothers and nurses do not as a rule appreciate the necessity of furnishing this necessary of life to infants in abundance. Too often when a child cries for water the nipple is thrust into its mouth. This affords temporary relief to its thirst, but in a few moments only increases it through the necessity for digesting the milk. Then when it again pleads for water it is supposed to have colic and is dosed with a carminative while all it wanted and all it needed was water. It is the aim of the Department to see to it that every child in the Commonwealth can be supplied with an abundance of pure water containing no germs of disease—no typhoid, no gastroenteritis, no cholera infantum. To this end our little army of health officers and engineer inspectors all over the State is constantly at work discovering and abating sources of pollution, whether of wells, springs, streams or reservoirs, while those wholesale sources of pollution, the cities and towns are gradually learning the golden rule and, stimulated by the orders and decrees of the Department, are so modifying their sewage systems as to relieve them from the charge that they are poisoning their neighbors.

A decrease of the typhoid fever death rate from 56.5 out of every 100,000 population in 1906 to 23.9 in 1909 is a sufficient evidence of the good results which have already been achieved in this direction.

In the direct fight against child destroying disease, the Department has made full use of the curative and prophylactic powers of the antitoxic serum. From its 650 distributing stations since October, 1905, the Department has in this way furnished antitoxin for the treatment of 20,794 sick children, whose parents were unable to purchase this, the only specific for diphtheria. Before the introduction of antitoxin the probable mortality out of this number as gauged by the records of New York Hospitals would have been 8,743. As a result of this treatment only 1,765 died. But the curative powers of this serum are equalled if not surpassed by its prophylactic powers, as is well known. For this purpose 15,100 persons who had been exposed to the infection were treated with immunizing doses. Of this number all but 270 escaped the infection wholly, and only 16 of these died. So that it is not too much to claim that this Department has in this way alone been instrumental in saving 6,968 lives, and in preventing contagion and immense loss of life in several thousand other cases. In the former this saving was effected by an average outlay of seven dollars each and in the latter of two dollars.

Our churches have been for many years sending out devoted missionaries to India moved by the stories of the horrible yearly sacrifice of child life under the wheels of the car of the God Juggernaut, where the cries of the victims are drowned by cymbals and drums and the shouts of a frenzied multitude, and yet at the same time we have been annually sacrificing on the anniversary of our nation's independence a greater number of our own children amid a horrid orgy of noise, din and riot, on the alter of the imaginary goddess of Freedom while, less merciful than the Hindoo, thousands of the maimed or blind survivors are left to drag out a miserable existence, a burden on the community and the State. Having for many years vainly tried to convince our people of the enormity of this crime, committed under the mistaken impulse of a spurious patriotism this Department is striving to diminish the list of victims by establishing stations at fifty-eight points in the State at which physicians can obtain antitetanic serum. By the use of this opportunity it will be possible to save many of these little unfortunates otherwise consigned to a death of agonizing torture, in the spasms of lock jaw.

The recent awakening of interest in the subject of that most destructive disease tuberculosis has brought to light a fact not generally appreciated, namely, that tuberculosis is quite a frequent disease of childhood.

In proof of this I present a few figures.

Kirchner, in a recent table based on Prussian statistics, shows that a sudden rise in tuberculous mortality in children commences at the fifth year and rapidly increases, indicating that "certain conditions enter the child's life during the school period which enormously increase his risk of dying of tuberculosis." The early point of attack seems to be the bronchial glands. In these glands the germs of the disease may lie dormant for many years. Many of the inscrutable fevers of childhood are due to these glandular affections, which are often the point of departure of the graver tuberculous affections.

"In the tuberculosis dispensary of Cleveland, Ohio, every Saturday afternoon is devoted to the examination of the children of families in which tuberculosis exists. Out of 500 examined, 20 per cent. have shown by physical signs, although the general condition of the child is good, that ganglio-tuberculosis (tuberculosis of the glands) exists."

Roux and *Jousserand* practiced clinical examination by the radioscope and found that 44 per cent. of the children examined in schools of Paris and Cannes were tuberculous."

Kirchner also states that as a child grows older the acute contagious diseases are less serious and tuberculosis becomes more serious.

"In the first year of life," he says, "whooping cough, measles and diphtheria claim more victims than tuberculosis."

"In the second year measles, diphtheria, whooping-cough and scarlet fever each has a greater mortality than tuberculosis which occupies a fifth place in the mortality rate."

"From the third to the fifth year tuberculosis occupies a fourth place with reference to causes of death."

"From the sixth to the tenth year tuberculosis occupies the third place."

"From the eleventh year on tuberculosis occupies the first place."

In the year 1906 out of 9,258 deaths from pulmonary tuberculosis, in this State, 1,456, or more than fifteen per cent. were of persons under twenty.

Of children over five years of age, and under nine, 39 died of that disease, of these between nine and fourteen, 166, and of those between fourteen and nineteen, 784, showing a most alarming increase during the later period of school life.

In the saving of life from this source of mortality of a thousand annually in the space of four years, which we have been able to demonstrate, this portion of the population has of course had its share. This has been effected principally through the ministration of the visiting nurses connected with our Tuberculosis Dispensaries. These valuable auxiliaries instruct the mother of the family not only as to the precautions to be adopted to guard the children against infection from the older member of the family who visits the dispensary, but also as to the proper food for growing children, and the mode of cooking it, their dress, mode of life and especially the ventilation of their sleeping rooms.

The Tuberculosis Exhibit which is constantly touring the State is filling a most important function in assembling, with the approval of the school authorities, all the school children, and giving them careful demonstrations and lectures in popular language pointing out the dangers of the disease and describing the measures for its avoidance. These are listened to with the greatest interest as evidenced by the fact that the children also attend the evening lectures to the public in large numbers and bring their parents with them.

Starting then with the cradle, if not earlier, our aim is to conduct the growing citizens of the State through the perils which environ their earlier years, acting in harmony with the school authorities as the advisor and mentor of their parents in all matters pertaining to their healthful development, until they are ready to assume their places as healthy and vigorous as well as properly educated members of society.

Pennsylvania
Health Bulletin

No. 16. HARRISBURG, PA. OCTOBER, 1910.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE CONSERVATION OF INFANT LIFE IN PENNSYLVANIA.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 16. HARRISBURG, PA. October, 1910.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Conservation of Infant Life in Pennsylvania.

If we are to take up the problem of the conservation of human life in earnest we must study the subject in its natural divisions in a scientific spirit. And to do this we must begin at the beginning and start with the conservation of infant life.

This is not a problem affecting the health authorities alone, as the most potent causes of infantile deaths are not subject to statutory regulation or control. It is not a problem affecting physicians alone for the reason that the same causes are beyond all therapeutic possibilities. It is not a problem affecting any particular class or creed alone, as its causes are so complex that none can escape some share in the responsibilities for their existence.

It is, on the other hand, a problem which concerns the mental, moral and physical prosperity of all people throughout the civilized world, and to this extent every force and every influence of the individuals, societies, churches, schools, states and nations must be solicited and enlisted in a campaign of appreciation and helpfulness which presents the only means of solution.

It is obviously impossible in a paper of limited scope more than barely to emphasize the gravity of infant mortality, enumerate some of its causes, and outline some of the means of prevention.

The term "infant" should be considered as relating only to children under one year of age, and this limitation will apply to all statistics mentioned. A broad view of the subject, however, should include those months of intrauterine life between fetal viability and birth. The problem is, therefore, not one alone of conserving the lives of children born living, but also of lessening the number of those born dead.

During the year 1909, 9,557 stillbirths were reported in Pennsylvania. Approximately 10,000 conceptions had progressed to that point where fetal life was established and subsequently lost through some interruptions in the normal progress of pregnancy. We have here not only an extensive waste of possible life, but as each pregnancy reduces the fecundity of females we have a serious depletion of our vital resources upon which we are dependent for a normal renewal of our species. As the efforts to reduce this particular waste must be largely identical with those required to reduce the excessive mortality among living infants from certain causes, we must remain constantly alive to the fact that it is not alone with live births we must concern ourselves if we are to reap the greatest measure of success in this work.

An important original contribution to this subject has just been made by Drs. Allen J. Smith and F. D. Weidman, of the McManes Laboratory of Pathology of the University of Pennsylvania, and published in the last *Medical Bulletin* of the university. The title of the paper is "Infection of a Stillborn Infant by an Amebiform Protozoon."

The subject was a stillborn fetus, supposed to be ten days overdue, but its appearance did not indicate that it had been long dead. The surface was not at all macerated and the tissues were fresh, and quite fit for microscopic examination, with a fair staining reaction. In fact, its appearance was so fresh as to encourage efforts at resuscitation.

The health of the mother had been good during the entire pregnancy, repeated ordinary examinations having shown nothing unusual. After delivery she developed a "milk leg" and showed symptoms of a slight urinary infection. Examinations of the blood and urine during this period showed no parasitic bodies of any type. The weight of the fetus was seven and one half pounds and its nutrition was poor. It was examined in the ordinary course of routine examination of fetal tissues. No gross abnormalities were found in the placenta, child or cord.

The protozoa which form the basis of this communication were found in sections of a kidney, the liver and a lung. The cells in question varied in shape from a round to an oblong outline or were pyriform or irregular from extension of the pseudopodia. The majority ranged between 0.025 mm. and 0.032 mm. in diameter. The organisms were mononuclear, the nucleus relatively large usually measuring between one third and one half the cell diameter. Occasional clear evidence of phagocytic ability was manifested. There can be no hesitation in stating that the organisms may assume an encysted form in their parasitic occurrence. "It cannot be seriously thought," say the authors, "that these cells are other than protozoan parasites, their general appearance and the nuclear structure differing from any type of introcorporeal cell whether of embryonal or developed stage of life." They further declare that they have been unable to find other instances of such widespread infection of the viscera by amebiform protozoa at any time of life and no instances of infection of the unborn by any similar organisms.

I think we can agree with them that the case broadens considerably our ideas of the possible influences toward fetal disease and adds another item to the list of possible causes of intrauterine death. In fact I am not certain that we can not go further and hazard the suggestion that this discovery may throw light upon the cause of many heretofore inexplicable cases of prenatal death.

Several very important and startling facts became immediately apparent in any study of the statistics of infant mortality. There is no doubt that the best expression of this mortality is in proportion to the number of children born yearly, as population during the first year is very slightly disturbed by migration. Accurate birth registration, which is essential to such a method, is in our own country, however, of such recent practice that we are forced to express the deaths of infants in proportion to the total deaths at all ages, in order to form a basis of comparison covering an extended period of years.

From the statistics of England and Wales and the United Kingdom, where fairly complete registration of births has existed for many years, we find that, while general death rates have very materially decreased, the infant mortality rates based on the number of children born yearly have not diminished, but on the other hand have shown increases during certain periods.

During the half century, 1851 to 1890, the death rates for male in the United Kingdom declined 14 per cent., and for females 19 per cent. The infant mortality rate during the five-year period, 1888 to 1892, was 145.4. In the following similar period, 1893-1897, it was 153.4, and from 1898 to 1901 it was 154.4, the latter showing that approximately one in every six born, died during the first year of life.

An encouraging feature may be found in the rates for England and Wales which for the year 1907 were 118, a decrease of 16 from the average for the preceding five years. This low rate for a single year may, however, have been partially due to extremely favorable climatic conditions which existed during that time.

In the United Kingdom during the five-year period, 1839 to 1844, the deaths of infants comprised 20 per cent. of deaths at all ages, while sixty years later it comprised 25 per cent. of the deaths at all ages.

In the registration area of the United States, comprising over 50 per cent. of the entire population, for the year 1908, the deaths of infants comprised 19.7 per cent of the total deaths at all ages. In Pennsylvania during the year 1909, they comprised 23 per cent. of the total deaths at all ages.

When we further subdivide the total infant mortality we find that 67 per cent. of all the deaths occurred during the first six months of life, by still further subdividing we find that 47 per cent. of all deaths occurred during the first three months, that 20 per cent. of deaths occurred during the first month and by far the greatest proportion of these during the first week.

These statistics would indicate that the influences operating to produce such extensive immediately fatal results in the newborn must be closely connected with conditions existing at birth and not the consequences of external associations. When we examine the several causes of infant mortality we can more readily understand the import of these statistics.

Of the total deaths of infants in the registration area of the United States during 1908, 35.5 per cent. occurred from congenital malformation; prematurity; congenital debility, including atrophy, inanition, marasmus and the associated ill-defined diseases of infancy. These are the weaklings, the physically unfit who are unable to maintain an individual existence apart from maternal support. They may well be classed as the wreckage cast upon the shores of life largely by mothers, physically, mentally, morally and socially unfit for the burden of motherhood. The question may well be asked of all men, "Can we save such?" and equally well by the social economist, "Are such as these worth the saving?"

The "survival of the fittest" is an inexorable law of nature which is not easily defied. If we foster, and struggle to preserve, the unfit, we must inevitably bear the burden of their deficiences not alone in the present, but from their perpetuations during the coming unborn generations. The economic side of these questions is perhaps solved for us by our moral and social obligations.. We can save many of these weaklings and their presence with us is no doubt needed to impress upon us the full measure of our neglect of obligations in the past as well as to point the way in the future. The work of saving points to the way of prevention and the work of prevention leads us along paths of individual and social betterment.

If we would rob infant mortality of its greatest asset we must go back beyond birth and deal with the parents who give not of their physical fiber alone, but of their moral and mental equipment; for if we are to do our full duty we must go back beyond conception and deal with both mother and father who shall each contribute to the foundation of a new mental and physical life.

We are rapidly approaching the time when a basis for life must be established on a basis of health, mentally as well as physically. Here is work for the social economist, church, educator and philanthropist as well as the physician and public hygienist. It should be the burden of every honest man and woman. And in this connection we must not forget the legion of stillbirths before mentioned whose prevention naturally forms a part of this particular work.

The prenatal influences on infant mortality can not be overestimated. These are influences exerted by overworked and unfed mothers during pregnancy, the direct influence of poverty, of mothers and fathers affected with constitutional diseases, of mothers ignorant of the mental and physical requirements of motherhood, of mothers who are the victims of depraved and vicious habits. The mortality of illegitimate infants is twice the mortality of legitimates. The mortality of firstborn infants conceived under the influence of alcoholic celebrations of marriage feasts are almost in the same proportion without considering the preponderance of imbeciles and epileptics who unfortunately do not die during infancy. The children conceived by European peasants during the intoxications of the festal seasons contribute disproportionately to the infant deaths and to the degenerate population: and equally well the child of the social butterfly, if it does not die unborn, may live through infinite care and pains, a physical and moral weakling whose only capability may be the perpetuation of its own kind.

The second most important cause of infant mortality is the diarrheas of children. They cause 20 per cent. of the total deaths of all ages. A certain and underterminable proportion of deaths which occur from this cause, particularly during the first three months, is no doubt due to congenital deficiencies which prevent the digestion and assimulation of any and all foods. Climatic conditions exert a powerful influence on this disease, 80 per cent. of all deaths occurring during the summer months, with direct exacerbations through periods of high temperature, with accompaning high humidity.

Urban rates are consistenly higher than rural rates and the rates of the overcrowded tenement districts higher than the average urban rates.

The increasing inability of mothers to nurse their children; ignorance in reference to artificial feeding, to clothing and to personal hygiene; poverty, which prevents the procuring of proper foods; the lack of fresh air, are the principal features in creating high mortality rates from this cause. The burden of correcting these deficiencies must be distributed among physicians, health organizations, and social and philanthropic societies.

The third most important cause of infant mortality is the group of respiratory diseases including acute bronchitis, pneumonia and broncho-pneumonia, which caused 14 per cent of total deaths from all causes. The prevention of these diseases must depend largely upon application of the best principles of personal and home hygiene. The value of fresh air and sunlight must be carried to the tenement dweller and particularly to the tenement owner. The problem is largely one of rental income *versus* infant life.

Convulsions stand next in the list of important causes, contributing 4 per cent. of total deaths of infants. As in cholera infantum many of these deaths are undoubtedly due to congenital deficiencies, which manifest themselves solely through disturbances of the nervous system.

In the four causes before mentioned we have accounted for 80 per cent. of total deaths of infants from all causes. Of the acute infectious diseases, whooping cough caused 2 per cent. of the total, measles slightly less than 1 per cent. and other infectious diseases a negligible proportion.

It should be apparent from these facts that the prevention of infant mortality is a most complex problem, affecting every branch of our social organization, but, just as many of our social reforms at the present time are germinated in the science of hygiene, it follows that the physician as an exponent of that science must individually and collectively assume the role of teacher both in public and private.

The world is awakening to the cry of conservation of all material resources, but particularly of human life, and in the future the physician as a hygienist must, if he fully realizes and lives up to his responsibility, command the admiration and respect of all men.

Pennsylvania Health Bulletin

No. 17. HARRISBURG, PA. November, 1910.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

PENNSYLVANIA'S STANDING ARMY OF HEALTH.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 17. HARRISBURG, PA. NOVEMBER, 1910.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Pennsylvania's Standing Army of Health.

Up to the later years of the last century only a straggling, desultory warfare had been waged against preventable disease within the borders of this Commonwealth. Isolated health boards and solitary sanitarians here and there carried on a gallant fight, but against great odds, because lacking the element of intelligently combined action which is essential to success in every general movement. A prominent English medical review of that day speaking of our fragmentary and disjointed system of hygienic administration, if system it could possibly be called, said:—"There is much good work done under a species of semi-authority and sufferance and by volunteer exertion; but the plaint is the lack of central authority and administrative power to make sanitary supervision an effective reality. The water supply of a considerable portion of a great city is abominably polluted but no sufficient authority is found to remedy it; there are numerous and deplorable nuisances, but no efficient inspectors."

So much for the health organization in this State as then seen by the intelligent European traveller. If he now visits our shores how different the picture that spreads itself before his intellectual vision. No longer a band of unorganized guerillas and self goverened volunteers but a grand standing army, numbering its troops of all arms by thousands, having its headquarters in the magnificent capitol of the State, but with its officers and sanitary agents in every county and township constantly in the field, well equipped, thoroughly drilled, in daily and hourly touch with the general commanding, ever beating back the ever present enemies Tuberculosis and Typhoid, ever ready to leap into battle when the vigilant scouts proclaim the advance of an epidemic. Nuisances immediately abated—epidemics promptly checked—streams regaining their virgin purity—death rates diminished—registration of vital statistics strictly enforced—prompt reporting of preventable diseases—these are some of the noteworthy evidences of the good which the steady advance of this army is accomplishing. A comparison of the death rates of the year 1909 with those of the previous year shows an actual diminution in the total morality of 1,184, in that from typhoid fever of 738, from the diarrhoeas of infancy of 311, from measles of 354 and from whooping cough of 354, and this in face of the fact of a rapidly increasing population. But if this work is to go on improving from year to year until the possible minimum of preventable disease is reached, there must not be a single backward step taken. The army must be kept up to a high standard of efficiency all the time. Our treacherous enemies are ceaselessly on the watch night and day. The moment we relax our vigilance or fall back from our defences. they will regain their lost vantage ground; and just here exists the strength of a standing army as compared with volunteers. The work done by the latter may be admirable and effective in limited areas, here and there, while the enthusiasm of humanity which inspires it lasts, but it is fitful and unreliable and may fail at the most critical moment. Only an organization having a broad, firm basis resting on organic law, supported by the whole authority of the State, acting with impartial force over the whole domain of the State, and assured of the permanent supply of the sinews of war, can conduct a successful campaign and win out in the struggle with the forces of destruction. "No man goeth on a warfare at any time without counting the cost" and no man can conduct a successful warfare who has not only carefully counted the cost but who is not assured in advance of his base of supplies and of a full treasure chest. This war cannot be prosecuted without spending money, and one reason and an important reason why it has been possible in Pennsylvania to prosecute it with a considerable degree of success is that the Legislature has shown a high degree of statesmanship in providing means for carrying it on commensurate with the magniture of the undertaking. The Department of Health has not been called upon to "make bricks without straw" or to send its troops into the field with insufficient equipment. While it has been held to the strictest accountability in the matter of its disbursements by the vigilant Executive of the State, it has never been interfered with at the dictates of false economy, in the prosecution of any reform which could reasonably be shown to be demanded for the welfare of the people.

Our public prints have been filled during the past two years with the statements of the high cost of living, the increasingly high prices of the immediate necessities of life. One great factor of this extravagant cost of living is ill health and untimely deaths. President Roosevelt truly said "It is a mere truism to say that luxury and extravagance are not good for a nation. So far as they affect character, the loss which they cause may be beyond computation. But in a national sense there is a loss greater than is caused by both extravagance and luxury put together. I mean the needless, useless and excessive loss to our people from premature death and avoidable diseases. Wholly apart from the grief, the suffering, and the wretchedness which they cause, the national loss each year has been calculated at nearly twice what it costs to run the federal government."

Just as really as "time is money," time is food. Not only does the toll of sickness as measured by loss of wages fall on those whose life work is the production of food equally with those concerned in business of other kinds, but each particular form of industry must bear its share of the common loss sustained by the whole community when any single member is incapacitated from doing his day's work by ill health. And so every day's work lost adds either directly or indirectly to the general cost of living.

Careful estimates lead to the conclusion that there are 3,000,000 persons on the sick list all the time in this country and that one-third of these, or 1,000,000, are wage earners. Let us assume that only three-fourths of these are actual producers, and that their average wages would amount to $700. The loss to the country will then be more than $500,000,000 annually and this loss cannot fail to be reflected in the general cost of living. When we come down to the last analysis, the only thing that has any real intrinsic value in this world is human labor, and the moment that is checked by illness it ceases to possess value.

Let us consider for a moment who are the foes which this army is enlisted to fight and who are threatening the lives of our nearest and dearest, wasting our resources and sapping the very foundations of our prosperity.

The grim Captain of the soldiers of Death, Tuberculosis, the Conqueror, still marches with drawn sword at the head of the column, although of recent years his firm ally and foster brother, Pneumonia, is conducting his share in the campaign with almost equal relentlessness and skill. Between them they leave the ground strewn with corpses on either side as far as the eye can reach.

Following close upon the track of these redoubtable chiefs comes Typhoid, treacherously gathering in his victims by poisoning the waters and the food on which they depend for the continuance of life. In league with Typhoid and indeed the ally of all the infections, surrounded by clouds of noisome buzzing, stinging insects, borne on the wings of the wind, comes devilish Baal-Zeboul, the Fly God.

Then with stealthy tread, like the red man of the forest, comes, heralded by the raging dogstar, Cholera Infantum and his crowd of straggling assasins, ready to snatch the infant from its mother's very arms.

Hovering on the flanks of these leading battalions, appear the red banners of the auxiliaries, Scarlet Fever and Measles, training their guns on our crowded schools, while insidious Whooping Cough leads his sharp shooters into the fray, picking off the young children by the thousands.

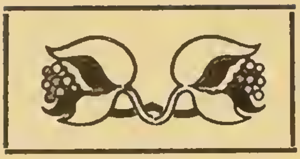
The terrible destroyer, Smallpox, his advance momentarily checked by the strong fortress of vaccination, lurks in the rear, gnashing his teeth like a tiger ready to spring upon its prey the moment that the walls are left unguarded.

The stranglers, Diphtheria and Croup, sneak unnoticed into our homes and throttle our darlings before their parents' eyes.

Truly a terrible array and in deadly earnest. But our scouts, equipped with those arms of precision, the miscroscope and the test tube, are constantly on their trail, discovering their hidden lairs, ferreting out their secrets. The campaign is thoroughly mapped out, their strongholds are being undermined and but for the traitors in the camp, success is assured. The traitors—where are they found? In the very homes which this army has been organized to protect. Those who should be our most loyal allies in the fight, the fathers who grudge the money necessary to purify our water and perfect our sewerage systems, the mothers, who, to make sure of getting their money's worth of schooling from the State, send their children out to convey infection to their little playmates before the period allotted by the State for school exclusion in such cases has expired. In rare cases even the doctors who assure parents that measles is a necessary experience for every child and that "the sooner it's over the better."—In other words, greed of gain, selfishness and carlessness are the three characteristics in human nature that our warfare must be waged against. Instead of treating the matter in a wholesale way and calling upon you to consider large collections of figures giving death rates, difficult to comprehend and still more difficult to remember, let me take it up in the concrete.

Come with me to this darkened, still chamber of death, and as your eyes penetrate the gloom see this fair-haired child lying cold, motionless, lifeless, while from the adjoining room come the wails and sobs of the heartbroken mother and sisters. A fortnight ago this pallid corpse was a beautiful being in all the flush of early girlhood, rejoicing in her own loveliness, exuberant in her joy of life. What has wrought this terrible transformation, weighted with crushed hopes and broken hearts? The story is briefly told—Mrs. White had issued invitations for a New Year's party for her own children. The children in the neighborhood had heard of it and were all agog to go. Mrs. Brown knew that there had been both measles and scarlet fever in the White mansion two months ago and hesitated about accepting the invitation for her own darlings but finally consented. What she did not know was that when the White children were well over their attack one of the maids was taken sick and passed through a mild attack of measles. "How unfortunate! This would just break up the whole party—It must be kept quiet—No one must know anything about it." All in the house were sworn to secrecy. Mrs. White had no very definite notions about sanitation but satisfied her conscience by burning a patent disinfecting candle in the maid's room. The doctor was not called in, and, the health authorities not being notified, the usual precaution adopted by the officers of the army of health of placarding the house and thus warning the neighbors of the presence of the lurking foe was not taken. The party was held and all went merry as a marriage bell, the convelescent maid waiting on the guests. Mrs. Brown joined with Mrs. Black and Mrs. Grey in congratulating the hostess on affording their children such a delightful entertainment. "Death" as every one knows, "loves a shining mark" and Measles, one of his most trusted henchmen, aimed his poisoned arrow at the loveliest of the group. His aim was sure and this is the result; but it was the traitor in the camp that rendered powerless the perfectly arranged plans of the General in command to protect that budding life. Nor did the trouble end here. Mrs. Brown's children were not the only ones of the guests to be attacked; and before the guards were aware of it, the enemy had swarmed in, the village was in the midst of an epidemic, and the endless chain of contagion had gained a new link.

This is no fancy sketch. It is being repeated in one form or another, with one disease or another, in one place or another, in the home, in the school, in the church, all over the State, and this it is which makes the warfare so difficult a one even for a standing army to cope with—treason in the camp.



Pennsylvania
Health Bulletin

No. 18. HARRISBURG, PA. DECEMBER, 1910.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

PRODUCERS AND CONSUMERS.

PENNSYLVANIA'S TUBERCULOSIS SCHOOLS.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 18. HARRISBURG, PA. December, 1910.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

PRODUCERS AND CONSUMERS.

Mankind may be roughly divided into two general classes or ranks:—

The producers and the consumers.

The prosperity of any country may be roughly estimated by the comparative size of these two ranks.

The motto of the Health Department is "keep the ranks of the producers filled while we are reducing the ranks of the helpless consumers."

The producers are all persons of both sexes, who are diligently and efficiently attending to the business of life. They are by no means confined to those who are, as agriculturists, persuading mother earth to yield of her bounty for the use of man and beast, or rearing countless flocks and herds, or, as miners, delving in her bowels to bring out hid treasurers of gold, silver or anthracite, or, as merchants and mariners, traversing her pathless oceans and broad continents to distribute these products over her entire surface to the very ends of the earth that they may be made use of by all who need them. They are not less truly producers who, though they have never driven a furrow or handled a pick or sailed a ship, as they sit behind their desks, with busy brain and intense thought work out the problems of interchange of commodities and values and barter and exchange. Especially are they entitled to be called producers who by their faithfulness and diligence are training up the youth of the land to fill their respective positions in all these varied vocations with profit to the State and honor to themselves and the community, and they who devote their lives to fostering honest and right living and high ideals without which we should gradually lapse back to barbarism and all prdouction would cease. And the innumerable company of helpers to these brain workers, plodding clerks, flying-fingered typewriters, all the busy throng of earnest, honest workers have their claim to be counted in this honorable rank. But, above all, the mothers of the race, they who have given of the fruit of their own bodies, and whose whole lives are one constant sacrifice to the patriotic duty of ministering to the necessities, bodily, mental and spiritual, of future producers, and of those who are bearing the burden and heat of the day. All these, even though they have never sowed one tiny seed or made a single blade of grass to grow, are true producers. None of these could be spared from the ranks. Each in his or her place is essential and each is entitled to honor just to the degree that his or her work is honestly and fully performed. Each of course is a consumer as really as a producer, but not a *mere* consumer, not a *helpless* consumer.

Who then fill up the ranks of the *mere* consumers, the *helpless* consumers? Leaving out of consideration children of too tender age to be productive, they are of two classes, those who won't work and those who can't work.

Those who won't work are first those unfortunate beings who have been brought up with every wish gratified to think that they never need work and that on the whole work is undesirable and not "good form." For them life is one long playtime, and while it may be true that "all work and no play makes Jack a dull boy" it is as certainly true that all play and no work makes Jack a spoiled boy, spoiled for all the greater and nobler purpose of life, spoiled even for play, early tired of living, worn out, blase'. Of these our country furnishes more than its share, for while the born aristocrat has certain lines of conduct, even of duty, prescribed for him by convention, the child of the American plutocrat is without an aim in life beyond self indulgence. The social butterfly of either sex is certainly a *mere* consumer, adding nothing to the general weal.

Secondly, those, even more unfortunate, who have, through dissipation or ill conduct, become vagabonds or tramps. We all know them and sometimes pity them, but we must recognize them as *mere* consumers and social parasites, preying on the community, useless and worse than useless.

Finally, those, who can't work. Ah! these are indeed the pitiful cases. They would work so gladly if they could, but early in life they were stricken with disease and were left blind or mained or halt. Some of them had scarcely breathed the breath of life when they were smitten with incurable blindness and must be inmates of asylums, wards all their lives of the State, *mere consumers*. Smallpox, Scarlet

Fever or Measles has left them with impaired vision or loss of hearing and speech, again wards of the State,—mere consumers; or spotted fever or poliomyelitis has laid its paralysing hand on them leaving them cripples or imbeciles for life, again mere useless consumers. And then there are those, saddest cases perhaps of all, who are suddenly arrested in the midst of their busy, ardent career as producers by the compelling hand of tuberculosis; and forced to lay down their tools and become helpless consumers, perhaps for months, perhaps for years, perhaps never to take them up again.

All of these helpless consumers belong to the class of chronic invalids, most of them permanent invalids. But it must be remembered that those who are ill with acute diseases at once cease to be for the time being producers and also become mere consumers and that the army of physicians, nurses and caretakers whom they furnish occupation for and thus keep from being producers are also mere consumers. To separate the chronic and permanent invalids from the temporary invalids for purposes of comparison with each other and with the able bodied producers would be a task of great difficulty, if possible. Careful estimates however lead to the conclusion that, taking chronic and acute cases together, there are probably at all times 3,000,000 persons seriously ill, and therefore in a condition of non-production in the United States. The population of Pennsylvania being about one-twelfth that of the entire country we are led to the conclusion that there are at all times 250,000 persons in the ranks of the helpless consumers in this State. It is a question whether the 8,798 insane with their 1,688 physicians and caretakers who are partly provided for by the State, and who would add another 10,000 to the list, should be added to or included in that number.

Now the serious aspect of this condition and that which compels the attention of thoughtful citizens is that probably at least one-third of the number of those who fill the ranks of the helpless consumers as the result of sickness have no business there and in a thoroughly civilized country would not be there. In other words, the diseases which have either permanently or temporarily placed them there are preventable. That is to say that, if reasonably attainable conditions of living had prevailed, eighty three thousand, three hundred and thirty three of these helpless consumers might be transferred from the list of consumers and made to swell the ranks of the producers. The average producer increases the wealth of the State, taking a "safe minimum for the average earnings of workers, from day laborers to railroad presidents," according to careful students of sociology by $700 per annum. If this estimate be justifiable Pennsylvania has lost during the past year $56,333,100, which she was entitled to. But, worse than this, she has been compelled to support the same number in idleness, using the term in no disparaging sense. The cost of sickness has been estimated at $1.50 per day per individual. If however we estimate cost of maintenance alone at 50 cents per day, the State will, in addition to its loss, have been paying a tax of $8,333,330. Are not these figures worth considering?

The disease which above all others, both by its great prevalence and by the long period of time during which it converts the producer into a mere consumer, is Tuberculosis and it is to do all in its power to check this waste that the Department of Health has established

PENNSYLVANIA'S TUBERCULOSIS SCHOOLS.

Everyone who has given the Tuberculosis problem thoughtful attention has soon become convinced that it can be solved only by the general diffusion of knowledge on the nature and causes of the disease and its methods of prevention and cure.

This must include instruction first of the Medical Profession and secondly of the people at large.

First, instruction of the Medical Profession.

The day of mere didactic teaching in medicine is largely a thing of the past. The hospital has become an essential accompaniment of the medical school. The attempt to make a doctor by compelling a half educated youth to sit seven hours a day on hard benches and listen to dry essays on dry bones and dried herbs, has been tried in this country and found wanting. Real bedside clinics have superseded to a great extent theoretical lectures and even amphitheatrical demonstrations. Medical Colleges which attempt to educate medical men by the antiquated, discarded plan without the adjunct of a hospital have lost the confidence of the profession and the public.

It follows from this that in order to acquire a thorough practical knowledge of tuberculosis a young physician must supplement the theoretical knowledge which he has been able to pick up at college by a patient, painstaking clinical study of tuberculosis at all stages and in all varieties of the disease. The occasional isolated case which a young doctor may pick up in the course of his own very limited practice, especially if he lives in the country, is by no means sufficient to make him a competent diagnostician—able to recognize a case of tuberculosis in its earliest stages when its cure would be almost a certainty. Numerous cases are received at Sanatoria, who have for months, yes, even for years, been going from bad to worse under the care of the family physician, suffering from supposed bronchitis, until they have reached such a stage that temporary amelioration is the most that can be promised them.

Fortunately our advanced medical schools in the large cities are fully alive to this necessity for practical clinical instruction in all diseases and especially for the education of the eye, the ear and the touch in the perception of the nice distinctions which go to make up the different pictures of phthisis pulmonalis and other affections of the lungs, and are doing their best to supply this defficiency, but there are not teachers and patients enough to go round, and besides most students are unwilling or unable to give themselves an extra year of study in taking a special course to perfect themselves in this important branch of the art.

Now let us suppose that small colleges for the study of tuberculosis alone, by those who have completed a regular medical course and hold a State's license to practice, were established all over the State, placed under the direction of physicians who have given especial attention to the study of this disease, provided with all the latest devices for ausculation, percussion and mensuration to ensure facility and accuracy in diagnosis and assure of ample material for study in the person of patients in all stages of the disease; and let us suppose moreover that opportunity were from time to time afforded the physicians in charge of these schools to visit the great city hospitals and attend clinics and demonstrations by the great masters of the art of diagnosis, is it not conceivable that in a few years there would grow up all through our State many practitioners profoundly versed in the knowledge of this most destructive ailment, acute as diagnosticians, and skillful as practitioners?

But this is exactly what the State Department of Health has been doing for the past four years in its system of Tuberculosis Dispensaries. While their primary object is the relief and cure of consumptives in connection with the sanatoria of the State, thus accomplishing the gradual diminution of this extensively distributed plague, yet the practical education of younger physicians in the minute details of investigation of lung diseases in all their varying aspects has not been lost sight of as an important subsidiary object.

But if the education of a considerable body of trained experts in Consumption is desirable, of vastly greater importance is the education of the people themselves—as to the true character of the disorder and as to the methods of life which it is necessary for them to adopt if they desire to avoid becoming themselves infected with the seeds of the disease and to see healthy, robust children growing up around them to full maturity.

Every one of these 115 dispensaries is a center of illumination, spreading the knowledge of the blessing of pure air at all times and seasons and hours, winter and summer, day and night. Pure air is as real a necessity to the health of the lungs as pure food is to the health of the rest of the body.

The number of pupils instructed by these schools is large. The total number of patients examined at these dispensaries up to the present time was 38,927. Every one of these individuals represented families numbering from two to ten persons so that it is safe to say that 230,000 persons have been reached by this agency under circumstances which were calculated to make a deep impression of the value of the lesson taught.

It is here that the social service side of the educational work assumes especial prominence. Whenever the number of patients enrolled at a dispensary is sufficient to warrant the Department in doing so, a dispensary nurse is appointed. At the close of the year 1910, there were 114 of these faithful workers on the roll.

As soon as possible after application for examination and treatment at a dispensary the patient is visited at home by a dispensary nurse. Immediately after her first visit she renders a written report to the physician-in-charge. She is expected to investigate the conditions in and around the patient's house, and the habits and health of the family, as well as their financial circumstances. She follows up the advice given by the physician showing its practical application to the individual case. She gives attention to the internal arrangements of the patient's room and makes such suggestions as may be important as to the improvement of its surroundings. The nurses' visits to the patients in their homes are of great importance not only on account of the instructions which they give but in the fact that they impress upon the patient and the members of his family the fact that the Dispensary, the Department of Health, and the Commonwealth itself are all interested in him or her individually and that close attention is being paid to their particular case. Experience shows that the nurses' visits tend to keep up the interest of the patients and lead to a more careful observance of the rules of the dispensary. Her work is also important in that she comes in contact with other members of the family who do not receive direct instructions from the physicians. In many cases they have discovered signs of failing health in other members of the family who have thus been led to apply for examination and treatment in the earliest stage of the disease when it is most susceptible to curative influences.

Not only does the nurse insist on the advantages of fresh air and sunlight, but the importance of using only digestible and nourishing food is urged. The mother of the house is taught to use discretion as to the cuts of meats which she purchases in order to suit the exigencies of the family purse, and is also shown the proper ways of cooking the food which she buys. She is taught that the best possible preventive of consumptioni s a good digestion androbust health and thesurest of consumption is a good digestion and robust health and the surest means of assuring these is eating such food and only such food as will build up the tissues of the body and avoiding those which merely tickle the palate, such as cakes, pies and sweetmeats. Especially is she warned against satisfying her children's appetite by cloying them with baker's bread and molasses. In every way the nurse endeavors to secure the co-operation of the patient and their families and to make each one feel that he or she has a mission and that this mission is to spread the doctrine of cleanliness, fresh air and plain, nourishing food.

Both by physician and nurse is the fact that the disease is communicable (catching) insisted on, and the most careful instructions are given in regard to the dangers of promiscuous spitting. All patients are liberally supplied with paper spit cups, cuspidors, and napkins, and are carefully taught that sputum must invariably be collected and burned. They are also taught to disinfect all articles liable to be infected by contact, such as clothing, bed clothes or eating utensils. Upon the removal of a person who has been suffering from tuberculosis the dispensary physicians notify the health officer of the district, by whom the vacated room or house is thoroughly disinfected. Thus the doctrine of the risks attending a case of consumption is taught from the beginning to the end of the case.

But the efficiency of the dispensaries as educators does not end here. The traveling tuberculosis exhibit which makes the tour of the State every year is under the supervision of the Special Medical Inspector of the Department and whenever it happens to visit a dispensary town a nurse is detailed to act as demonstrator for the multitudes of all ages who crowd to see it, while the physicians deliver more formal lectures, especially to the children of the public schools, a measure in which they have the hearty co-operation of the school teachers and superintendents. During the summer and autumn of 1909 this exhibit visited twenty-five of the dispensary towns. It was also displayed at two fairs, where it was largely attended and attracted much attention. The public press also gave it extensive notices and these aided materially in the diffusion of information. More than one hundred lectures were delivered and in the neighborhood of 80,000 people attended the lectures and viewed the exhibit. Thus both to the physician and to the public are the State Tuberculosis Dispensaries proving educational centres to an extent which justly entitles them to be called *Tuberculosis Schools.*

Pennsylvania Health Bulletin

No. 19. HARRISBURG, PA. JANUARY, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

The Effect of Injections of Taurin upon Tumors of Mice and Dogs.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911.

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 19. HARRISBURG, PA. JANUARY, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Effect of Injections of Taurin Upon Tumors of Mice and Dogs.

STATE DEPARTMENT OF HEALTH LABORATORIES.

The experiments here recorded were suggested by the effect of taurin upon acne as observed by Dr. Dixon.

The effect upon the activities of gland structures and epithelium of normal type in inflammatory state impressed him so much that he decided to try the chemical upon aberrant or tumor epithelium. To this was added for comparison a sarcoma or lymphoma.

We obtained from the Rockefeller Institute through the kindness of Dr. Simon Flexner and Dr. Peyton Rous, a carcinoma of white mice (R I No. 33, 10th generation). We received also from Dr. S. P. Beebe of the Loomis Laboratory, New York City, whose kindness we wish again to acknowledge, a piece of the transmissible lymphosarcoma of dogs. These were inoculated into the respective animals at our laboratories.

The first named tumor may be classified as a carcinoma simplex. It seems as if it may have started as an adeno-carcinoma but as it grew in our stock it had lost the distinguishing characters of this type. The sarcoma of the dog was a solidly growing tumor of round and polygonal cells, with deeply staining, albeit reticulated, nuclei, supported by scanty but distinct connective tissue. The blood vessels were small but had clear walls.

MOUSE TUMOR, CARCINOMA SIMPLEX, AND TREATMENT.

Over one hundred mice were inoculated, from which 31 were selected for treatment with taurin, 14 were used as controls and 4 as transfer animals. From these we have microscopical sections of 17 treated animals, 7 controls untreated and 4 transfer mice, also controls. Other injected mice were either unsatisfactory in tumor development or died before use. The tumor started to grow in about 2 weeks, and as soon as it had reached 6.8 millimeters, treatment was begun. This treatment consisted in injecting a solution of taurin in physiological salt solution, beneath the skin either about the tail or near the tumor. We soon discovered that the first mentioned method had no effect whatever, so that we abandoned it in favor of the site near the tumor. We at first measured the growth of the tumor day by day but found that the varying susceptibilities of mice for these growths caused very great irregularities in the course of growths in the controls, so that measurements were omitted and we relied upon the ultimate fate of the growth and its microscopic appearance. When ulceration occurred on growing tumors, they were immediately used for taurin injections. Three of these we saw dry up and heal completely. We did not see any effect of the taurin upon the rate of growth or ultimate size of the tumors. The mice bore the injections well. The average life for the injected mice is 2 days longer than for the controls. The doses varied from .5 to 2. milligrams. To dedemonstrate whether these taurin injections would have any effect upon the transmissibiltiy of the tumor, a series of animals was injected 6 times in 10 days with 5 milligram doses and the tumors then removed to be injected into other mice. These latter tumors grew as well as controls of the same generation.

This strain of carcinoma simplex has a great tendency toward degeneration with the production of large areas of acid staining material composed of non-contrast-staining cells, surrounded by zones of nuclear fragments mixed with a few poly-nuclears and small lymphocytes. The typical cancer nests are as a rule perfectly preserved in the region lying beneath capsule. Those lying deeper, if not necrotic, as we have chosen to call them because of the numbers of broken down cells or lack of differentiation, are loosely arranged and distorted by congestion or edema. The tumor remains encapsulated throughout our series. The differences between the controls and the treated tumors are difficult to describe, yet some difference exists. Probably the greatest difference lies in the relatively few zones of broken nuclei and cellular infiltrates about necroses and in poor cell staining of cancer nests in the deep parts or treated tumors. Several microscopic fields side by side may fail to show any basic staining elements. This is not true of control tumors.

A whole microscopic field may show a well preserved alveolar arrangement with clear cell outline and yet the nuclei can hardly be distinguished. The zones of nuclear fragments so conspicuous in the controls are but suggested, indeed sometimes completely absent, in the treated tumors. In the well preserved parts of the treated tumors the cancer cells are precisely the same as in the controls and the atypical mitotic figures are quite as numerous. Connective tissue is if anything more active in the control tumors.

This widespread loss of basic staining power, combined also with the necroses, perhaps a trifle less marked than in the controls, seems to have no effect upon the growth of the tumors. The rate of growth is essentially the same in the treated animals and controls. We can therefore state that the effects of taurin injection upon mouse carcinoma simplex is in hastening the healing of any ulceration that may appear and in causing a loss of basic differentiation in the central cells of the tumor without affecting its peripheral nests or its rate of growth.

DOG TUMOR, LYMPHOSARCOMA AND TREATMENT.

Two dogs were inoculated with the material sent by Dr. Beebe, one to be treated and one to serve as control. Two pieces were planted in each animal, one under the skin of the pectoral region and one near the genital apparatus. All plants grew well, beginning in about 3 weeks. The first animal was then treated 51 times with taurin in the next 4 months as follows: 10 milligrams beside tumors alternately 4 times, 20 milligrams once, 10 milligrams into ear veins 4 times, 20 milligrams into ear vein twice and 100 milligrams beside tumors alternately 40 times. The growth of the tumors showed some fluctuation, but the tendency was to grow gradually larger, keeping pace with that of the tumors of the control dog until the last 6 weeks when the treated tumors rapidly outstripped the control tumors in size. The first and last measurements of each are as follows:

No. 1. Tumor treated.		
Pectoral	20. x 25. mm.	67. x 55. mm.
Inguinal	10. x 10. mm.	47. x 45. mm.
No. 2. Tumor control.		
Pectoral	25. x 20. mm.	58. x 53. mm.
Inguinal	15. x 15. mm.	38. x 35. mm.

A small ulceration on the inguinal plant of Dog No. 1 seemed to heal very rapidly, after the first dose of 100 milligrams near this tumor.

Histologically the tumor has changed a little from the original after passing through our dogs. The nuclei have become somewhat vesicular and there is considerable round cell infiltration scattered irregularly through the tumor. In the portions poorly supplied with blood, small necroses have occurred. The treated tumor differs from the control only in the existence of small areas where the cell and nucleus outlines are well preserved but the basic elements are not deeply stained. This is similar to the mice tumors.

From this Dog No. 1 two other dogs were inoculated. These transplants are growing well (Dog 11 and 12).

It can therefore be said from this experiment that taurin injections into dogs bearing lypmhosarcomata do not inhibit the growths of these tumors or prevent their transplantation. The only change observed refers to the loss of basic staining in certain small foci in treated tumors and in this regard lymphosarcoma in dogs is similar to carcinoma simplex in mice.

HISTOLOGICAL NOTES OF TUMORS IN ANIMALS.

DOGS.

Tumor Dog No. 1.

Regularly arranged typical small cell sarcoma in irregular but definite alveoli. Scattered here and there throughout the section are places where basic staining differentiation is poor. The section is rather congested, blood vessels with fairly distinct walls, some being quite well formed. A few hemorrhagic extravasations are present in the sections.

Control Dog No. 2.

Alveolar sarcoma very suggestive of carcinoma because of vesicular nuclei, although they are quite small. Considerable round cell infiltration; some small areas of necrosis in which the cell outlines are well preserved but the nuclei are not differentiated.

MICE.

Original. Shows very uniform carcinoma simplex. In one part of section there is a parallel cleavage which divides the tumor into acinus groups. In the sections at hand there are no areas of degeneration, but one small perivascular round cell and leucocyte infiltrate is noted.

TUMORS USED AS TRANSPLANTS.

No. 59 (174), 78 (176), 153 (207), 204 (216).

No. 59 shows typical groupings much distorted by injected vessels and hemorrhagic extravasations. There are a few minor areas of necrosis accompanied by a great heaping up of nuclear fragments. Mitosis seems more active than in the original.

No. 78 shows a very uniformly arranged carcinoma without acinus groupings. The connective tissue septa are quite prominent. Proliferation is very active in both tumor and connective tissue portions. One or two minor necroses with preserved cell outlines are seen.

No. 153. Carcinoma Simplex with the alveolar arrangement well marked by actively proliferating rather edematous connective tissue septa. Many rather small areas of nearly complete necroses are seen and they are always outlined by round cells and nuclear fragments.

No. 204. This is the same as the last note except that the areas of necrosis are much larger and occupy about two-thirds of the sections of the tumor. In only a small part of the necrosis are the cell outlines preserved.

Untreated Tumors. No. 2 (146), No. 38 (155), No. 194 (219), No. 202 (318), No. 213 (225), No. 215 (220), No. 246 (217).

2. Well arranged carcinoma simplex with a very moderate amount of connective tissue. Few minor areas of necrosis accompanied by edema.

194. Alveolar arrangement well preserved by fully formed, not actively proliferating connective tissue. Moderate number of complete necroses, separated from tumor by a dense zone of nuclear fragments.

202. The tumor portions are very loosely arranged and the septa are wide by reason of injected vessels and, apparently, edema. Proliferation is very active in both connective tissue and tumor. A larger part of the tumor however, is occupied by indefinite necroses, some of which retain cell outlines but most of which are complete and are associated with great nuclear fragmentation.

213. This is almost exactly the same as last note, except that perhaps the necroses are not quite so extensive.

215. This is likewise the same as 202, but with slightly less necrosis. Proliferation is very active.

246. Alveolar arrangement well preserved, necroses very definite, complete and associated with great amount of fragmentation.

Treated Tumors. 3 (160), 29 (161), 39 (159), 56 (158), 77 (175), 99 (177), 84 (178), 85 (186), 94 (179), 98 (180), 108 (181), 110 (182), 111 (183), 114 (184), 156 (206), 178 (208), 180 (209).

3. 4 injections in skin above tail root.

Section is largely necrotic but in a diffuse, indefinite manner. The chromatic fragments are irregularly distributed and do not form a compact layer between a more or less necrotic mass and the tumor tissue. Typical carcinoma is very inconspicuous but there are many loose alveoli surrounded by edematous and injected proliferating connective tissue.

29. 3 injections in skin above tail root, 4 near tumor. This is essentially the same picture as the last one, the whole mass seeming degenerated. Connective tissue is inconspicuous except in capsule. Cell outlines well preserved in some parts.

39. 4 injections in skin above tail root. The alveoli are fairly well maintained but there is much necrosis involving all the tissue elements seen in sections. In some places this is complete, while in others the cell outline is well preserved. Connective tissue is loose and edematous. There is little nuclear fragmentation along the margins of the necrotic areas.

77. 2 injections near tumor. Very little diagnosable tumor remains except at the margin. The whole section takes the red stain and is very loosely arranged as if torn apart by fluid. Cell outlines preserved, connective tissue inconspicuous, necrosis is irregular.

79. 5 injections beside tumor. Practically same as 77, except that it is definitely more hyperemic and the congestion causes some of the alveoli to degenerate.

84. 7 injections near tumor. Very many of the cancer alveoli quite well preserved, distinct in outline and surrounded by fully formed and active connective tissue. This section is markedly hyperemic.

By far the larger part of the section is composed of areas in which the tumor cell outlines are well preserved and take the red stain, but in which proliferation seems to be active; some of the acid staining tumor cell areas have in their center completely necrotic areas.

85. 7 injections near tumor. The subcapsular portions of the tumor show very well the carcinoma alveoli; the deeper layers of these are torn as if from fluid. The center of the tumor is converted into a very homogeneously eosin-staining mass in which the nuclei are made out with difficulty and in some places over small areas cell identity is lost. Here and there are small irregular spots of poorly basic staining material.

94. 8 Injections near tumor. Well preserved alveolar carcinoma. Alveoli are small somewhat irregular. Connective tissue not abundant but forms a fine mesh work, apparently not active. There are a few areas in which the tumor cells are losing their identity with the production of small definite necrosis but for the most part the tumor is typical and actively proliferating.

98. 4 Injections near tumor. Carcinoma portions are beneath the capsule and are in rough acinus arrangement. The body of the tumor has lost its distinct differential staining except in very small areas. It is much injected. In the portions remote from the vessels there is almost complete necrosis but even where the cells have preserved their outline they do not take the basic stain well. Necrosis is not associated with peripheral nuclear fragments.

108. 1 Injection near tumor. This tumor very like last except that carcinoma areas are very inconspicuous and with the exception of the margin the whole tumor has lost its differential staining.

110. 4 Injections near tumor. Larger part of tumor fairly well preserved small alveolar carcinoma but in which there are irregular complete necroses confined to central portions. The basic staining properties of the central portion have largely disappeared with the exception of a few tumor cells, round cells and nuclear fragments about the necroses.

111. 8 Injections near tumor. The margins preserve the alveolar carcinoma picture very well although color differentiation is indistinct. In the central portions the whole mass takes the red dye, practically no nuclei being differentiated. Some of the alveoli are preserved but most of them have some degree of necrosis. Tumor moderately injected. Connective tissue not excessive.

114. 3 Injections near tumor. Very similar to last note except that cell differentiation is somewhat better maintained. There are spots of basic staining material scattered throughout the tissue. Degeneration not so marked as 111.

156. 3 Injections near tumor. Well defined alveolar arrangement, well formed and active connective tissue fairly well marked. About one-third of tumor shows large definite areas of necrosis surrounded by zone of nuclear fragments.

178. 1 Injection near tumor. Essentially same as last note, except that in center there is much more breaking up of the alveoli, less tendency to collection of chromatic fragments on margin of alveolar necroses.

180. 4 Injections near tumor. This is same as last two, with, however, less acid and basic staining differentiation in depths of tumor.

As antibodies or antitioxins often exist in the animal body either constantly or during the presence of pathogenic organisms or toxins, an important line of research has been suggested to those devoting their energies to the prevention of disease.

For years past the laboratories of the University of Pennsylvania and the Academy of Natural Sciences of Philadelphia and later of the Commonwealth of Pennsylvania have been working in that direction. The results arrived at in the foregoing paper are interesting as they show that Taurin, a substance constantly existing in the animal body, when added in excess to that found in the economy suffering from carcinoma simplex, caused death to the central portion of the tumor.

DIXON.
FOX.

P47EA

Pennsylvania
Health Bulletin

No. 20. HARRISBURG, PA. FEBRUARY, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

Some Duties, Ideals and Opportunities of the Country Doctor.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER

No. 20. HARRISBURG, PA. FEBRUARY, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Some Duties, Ideals and Opportunities of the Country Doctor.

The watchword of to-day in every branch of human activity is organization. The first step toward winning popular recognition is cooperation. The physician very soon after entering upon professional life discovers that he has three especial relationships, that with the public whom he hopes to serve and on whom he depends for support, that with his fellow physicians whom he should regard as friends and co-laborers rather than as rivals and with whom he must frequently consult, and that with the State which by conferring upon him a most valuable franchise has acquired the right to receive from him certain valuable information which he and he alone can furnish. Each of these relationships carries its own peculiar duties. All of them involve problems which it will be to his advantage to study not by himself but in collaboration with his fellows. It is this fact which gives its importance to the County Medical Society. If this form of association is an aid to the physician beginning practice in the city, to a still greater extent does it help the country doctor. The interchange of ideas and comparison of experiences which these meetings at regular intervals afford are a constant stimulus. They prevent his mind from growing rusty, and at the same time afford opportunities for becoming socially acquainted with his professional brethren. When physicians regardless of specialties or cliques gather together for the discussion of medical topics and for social intercourse, the broadening of the individual mind and the effacement of all lines other than those defining scientific medicine, as well as the promoting of fraternalism are sure to result. The first duty therefore of the young country doctor is to join his County Medical Society as soon as he becomes eligible, to to contribute to its scientific and intellectual activities and lend his influence to maintain a high standard of decorum and ethics in the intercourse of the members. The introduction of personalities into discussions, the formation of cliques and the playing of politics should be resolutely frowned down and the entire influence of the society should be for the advancement of the profession and the promotion of the public health. Especially should the requirement of the government for the reporting of diseases and of vital statistics be sustained. For we are looked upon in a somewhat different light from the members of any other calling or profession. Our every act is expected to be of a high moral character and we are looked to to set a good example to others in ready obedience to the laws of the Commonwealth. People seem to forget that the doctor like every other citizen has to provide the necessaries of life for himself and family, and look upon us almost in the light of charitable institutions. The doctor who will not respond to every call for the relief of suffering humanity, in whatever weather, at whatever hour of the day or night, at whatever cost to himself and no matter how small the chance for compensation, is regarded as little better than a brute. Not even from the clerical profession is such complete self-sacrifice expected. Greatly to the credit of our forefathers in the profession is it that such a standard of lofty devotion to duty and unselfishness should have been set for us and it should be our constant aim to live up to it.

This reputation, however, is unfortunately being discounted to a greater extent to-day than at any previous time. There is too ready a tendency to reduce the conduct of professional affairs to a purely commercial basis and to be governed more by trade practices than by professional ethics, although it is certain that the great majority of our members are men of high moral principle, men of educated and cultured minds and men willing to take more than their fair share of the philanthropic work that must be done for the unfortunate. Our aim both in the country and in the city must be to maintain our standing in the community as a profession and not a trade. Appreciating the difficulties which beset the country doctor the State of Pennsylvania has come to his aid in his daily work to a greater degree than any other State in the Union and possibly than any country in the world. Until the establishment of the laboratories of the State Department of Health in 1906, the practitioner in the country and the small town was at a serious disadvantage as compared with his city rival in the matter of diagnosis as aided by chemical and bacteriological tests. Comparatively few were able to maintain well equipped laboratories of their own, and fewer still probably possessed the necessary knowledge and were sufficiently in training to be able on the moment to make tests of this kind themselves. In the year mentioned, however, the Department of

Health through the generosity of the University of Pennsylvania was furnished a laboratory building and was enabled to offer to all physicians of the State practicing outside of municipalities having laboratories for the same purpose, laboratory facilities for the diagnosis of certain morbid conditions and the detection of obscure sources of disease, and announced publicly to the profession its readiness to make examinations in the following suspected conditions:

Tuberculosis: An examination of sputum, pus, exudates, feces and urine for the presence of tubercle bacilli. Attention was called to the fact that in probably no other affection does recovery as well as the safety of the patient's associates depend to so great a degree upon a correct and early diagnosis, and also that, on the other hand, "the examination of the sputum in chronic pulmonary conditions simulating tuberculosis will often clear up the diagnosis of, for example, unresolved pneumonia, bronchitis of non-tuberculosis nature and various degrees of atelectasis."

Typhoid Fever: An examination of the blood by the Widal test and an examination of the urine for Ehrlich's diazo reaction.

Malaria: An examination of the blood for the presence of the malarial plasmodium.

Dysentery: An examination of the feces for the presence of dysentery bacilli or the amoeba dysenteriae.

The theory and technique of each of the preceding tests was carefully described.

Parasitic Intestinal diseases: An examination of feces for the presence of characteristic parasites or their ova.

Morbid Growths: An examination of sections of tumors or the products of the infectious granulomata, obtained either during life or at post-mortem.

Pathologic Fluids: An examination to determine the specific organism.

Three separate outfits were at the same time prepared for taking specimens and careful instructions formulated and distributed showing how this should be done.

Since November 1906 when the laboratory first got into working order we have examined and reported on 17,912 specimens of water used for drinking purposes, giving in each instance the bacterial count and the B. coli communis determination; 23,810 sputum examinations, with very few exceptions made for the purpose of diagnosing tuberculosis; 650 specimens of pathological growths, including carcinomatous and other tumors either removed by operation or at the autopsy; 371 specimens of pathological fluids, including pus, peritoneal fluids and the like; 722 specimens of urine including bacteriological examinations (for typhoid fever, tuberculosis and special infection) diazo and some routine urinalyses for the Tuberculosis Dispensaries; 214 malarial blood examinations; 1,949 Widal blood examinations for determining the diagnosis of typhoid fever; 220 specimens of feces including tubercle bacilli, parasites, typhoid fever bacilli and pieces of tissue; and 2,957 miscellaneous specimens including specimens of diphtheritic membranes, making a total of 48,760 examinations. We have given prompt expert opin-ions on suspected cases of small pox and other infectious diseases whenever called upon. Through our tuberculosis sanatoria and dispensaries we have distributed 2,564,056 quarts of milk and 336,889 dozen eggs to poor patients.

We have placed at physicians' command at 650 stations, widely distributed throughout the State and at convenient points, the diphtheria antitoxin so that they have been able to save the lives of their patients whose pecuniary circumstances were such that they would otherwise have been unable to avail themselves of this, the only known cure for that disease. There is reason for believing that, before the government provided that biological product, many physicians more than once paid for it out of their own pockets rather than see the children of indigent families die of that terrible disease.

Moreover we have just introduced 58 stations from which can be obtained anti-tetanic serum for poor patients. To aid the doctor in preventing death by lockjaw is a blessing which he, in common with the public, must appreciate, as it is a death which everyone dreads to witness.

The Department also furnishes the profession with instructions for the sanitary precautions to be exercised by those in care of persons suffering from the various communicable diseases. These are designed for distribution in the famililies of patients, for the instruction of parents and nurses and are furnished free of expense.

Now what does this provision in various directions mean to the country practitioner? It means that he no longer need feel himself at a disadvantage as compared with his city rival. It means that scientific medicine can be practiced in the most remote and secluded corner of the State with almost as great a degree of promptness and certainty as in the crowded city. It means that instead of groping in the dark for a diagnosis, the microscope of the expert will be placed at his disposal to unravel a knotty problem and even that, under circumstances of unusual danger to the community, the expert himself will be transported to the scene of action free of all expense to the patient. More than that it means that he need no longer be compelled to see a patient die in the pangs of tetanic convulsion or the suffocative spasm of diphtheritic croup because the parents are too poor to purchase the life saving sera.

Availing themselves of the opportunities afforded by the Division for the Distribution of Biological Products, physicians in the rural districts have since the system was inauguarated in October, 1905, up to December 31, 1909, treated 20,794 cases of diphtheria, and administered the serum for the purpose of immunization in 15,125 instances. Of those immunized only 257 acquired the disease and the number of these who died was so trifling as scarcely to deserve mention. It is not an extravagant estimate if we claim that during those four years 8,000 lives were saved by this measure alone.

Probably no class of his patients rests more heavily on the mind and conscience of the country practitioner than the indigent consumptives. Knowing that the essential element in the arrest of the disease was an abundant supply of nourishing food, he was compelled to watch the downward course of the wasting sufferer towards the certain fatal termination, doing what he could to palliate suffering but powerless to stay its progress simply because the means were not forthcoming to furnish the necessary nourishment. Now through our 115 dispensaries with the working of which all country physicians are familiar, that load is lifted from their hearts. They know not only where to turn for aid in diagnosis in obscure cases but where the essential means of treatment in the shape of milk and eggs can be procured with absolute certainty and in sufficient quantity. Many of them have watched the course of tuberculosis sufferers well advanced on the downward road, in whom the progress of the disease has been arrested at the dispensaries and the patient has again become a useful member of society, as well as of others in whom the disease had made such ravages that the dispensary physicians had not deemed it wise to attempt to treat them under the unfavorable circumstances of home duties and cares and have therefore advised their resort to the South Mountain Sanatorium at Mont Alto, where the advantages of a regulated life, enforced rest and pure mountain air in addition to abundant food had brought about a like happy result.

As is generally known, the munificence of a Pittsburgh philanthropist has made it possible for the State to establish another sanatorium on the summit of the Alleghenies and before another year rolls around the physicians of the western part of the State will be able to afford their indigent patients similar facilities for recovery, while the latter are saved the fatigue of a long and often exhausting journey.

At the eastern end of the State, too, provision is being made for the crowded population of that section on a carefully selected site near Hamburg in Berks County on the southern slope of the Blue Hills.

The researches of the past year have put us in possesion of most important knowledge with regard to that mysterious affection which, when unfortunately not fatal leaves behind it a train of helpless cripples to be a burden to their families and the State, Poliomyelitis or Infantile Paralysis. In our laboratories an organism has been discovered which, if not the cause of, is at least peculiar to that disease, and the laboratories of the whole scientific world are busy on this quest with every hope of success. Once this organism is determinately found, we shall be well on our way to a discovery of the means of prevention.

But enough has been said to indicate how from the very beginning of its career, our Department has felt that co-operation of the medical profession was essential to the accomplishment of the great ends for which it was created, and how it has aimed to use the powers and means with which the wisdom and munificence of the Legislature have provided it, in such a way as to aid the hard worked country practitioner in the discharge of his laborious duties.

And now let us devote a few moments to the consideration of the real and lasting rewards which our profession holds out to those who enter upon its practice in the true spirit of the physician in the highest sense of the term. Let the young man who is proposing to make medicine his life work pause and carefully consider whether the golden calf is going to be his idol. If so he is doomed to disappointment. He would be justified of course in anticipating a return for his labors which will enable him to provide the necessaries of life for himself and the partner of his joys and cares and the little ones who will be growing up around him, and to sustain his position in the cultivated and educated class of society, of which he should aim to be one of the ornaments, and further to provide a margin out of which to save enough to provide against want in the days to come when the senses shall become so dulled by age that his conscience will no longer permit his continuance in the practice of his profession. But beyond that let him not aspire, if he would do his entire duty to his patients and enjoy to the full the delights which the doctor's life has in store for him. We are repeating a wornout truism, as old as literature itself, when we say that riches in the shape of mere money are far from bringing happiness to a man, or that on the other hand happiness must be waited for until a man has accumulated great wealth. Happiness should be, and may confidently be looked for day by day, in the day's work.

Can it be supposed that a wealthy banker gets as much pleasure after a hard day's work in his counting room that has netted him a profit of hundreds of thousands of dollars, as one of our profession who has entered a home where diptheria has laid low the darling of the house, and by his intelligent diagnosis and by the prompt injection of a full dose of diphtheria antitoxin has neutralized the deadly toxin sufficiently to enable him to inform the father upon his return from his daily labors that his child is saved?

Such happiness has come to many of us even early in our profession, without waiting long years, and we should cherish it and not allow ourselves to become dulled to its charm by its repetition.

Such a sense of exultation is more to us than great riches could possibly be.

Nor should we conceal the pleasure which we feel from those who hang breathless over the couch of their beloved child and await our decision. Let us show our sympathy and pleasure in that which is so dear to others. It is natural to us all and should not be masked. The saving of life gives us the most intense pleasure and wins for us the greatest of all blessings--the love of our fellow men. A real friend won by real deeds is thus bound to us by the closest of all ties.

Original research work such as is now going on in the laboratories of the medical world is affording us pleasure derived from what seems at times almost the resurrection of our patients. To-day we have the immunizing power of anti-tetanus serum and many other immunizing substances and antitoxins. Our experiments on the products of the tubercle bacillus have reached such a point that we are ready to say we have a factor in the treatment of tuberculosis which means at least an immunization to a greater or less extent.

The State is now working on a cure for cancer which has some degree of promise. This, however, has been tried on so few animals that it may not mean anything because we know that nature at times will overcome disease without human aid, even the apparently most malignant growth, yet when one is following out original research work it is only natural to hope for a result whenever the weather-cock shifts to the side of promise.

The natural instincts of youth are nobly sentimental. He puts a high value upon his own life and also upon the lives of others, but when he enters his second year in the medical school he often seems to think it more manly to treat the subject of the life of man with more or less indifference and some men unfortunately carry that feeling too much through life. This robs them of the greatest pleasure to be derived from the practice of their profession, and often loses for them the high respect they otherwise might receive from their patients and the general public.

Our aim should be to cherish the enthusiam of our youth and to avoid as firmly as possible the spirit of the cynic.

While recognizing fully the blessings conferred on the world by those who are patiently cultivating the field of original research, it should not be forgotten that this branch of medical science requires a mind of a peculiar character and that not usually the mind best constituted for conveying information to others. Hence in the selection of teachers, who are to prepare young men for the actual practice of medicine in our medical schools are we wise in our efforts to choose only those capable of great original research? Is it not possible that those who are endowed with fine scientific imagination will become too much absorbed in such work to make good teachers of practice? Are they not inclined to carry their instruction too far into laboratory work done at the expense of more practical clincal training which latter is the first essential to the every day practice of medicine?

Furthermore, if our students devote four full years after their complete college course to the science of medicine with but little practical training, is there no danger that they may get beyond the most receptive age at which their natural instincts can be most easily and most highly cultivated? More time therefore should be devoted to bed-side work.

When the medical man gets out into the field of practice he soon forgets much of his technical laboratory teaching and if at all successful as a practitioner he is unable to keep up with the advancing tide of laboratory technique, and therefore must fall back on the laboratory student to make his laboratory studies for him. For this reason advantage has been taken of the wise thoughtfulness of Professor Charles B. Penrose, who introduced the clause in the great Act of Assembly of the year 1905, to permit the Governor and the Commissioner of Health to devote to laboratory work a reasonable portion of the moneys appropriated to the Department of Health. This work is now being prosecuted as has just been described for the benefit of the practitioner of medicine.

Our medical societies composed of graduates from the various colleges, with the advantage of the experience derived from years of practice of medicine and from watching the young graduate's stumbles in his early days for want of more adequate clinical teaching, should take up this question with the seriousness which it demands and which it is already receiving in many parts of our country, and appoint delegates to congresses created for the purpose of discussing and forming a curriculum for the teaching of the medical practitioner on more practical lines than those which obtain at the present day.

Such a curriculum should meet the demand of the times to prepare the recent graduate for his service to the people among whom he is to practice in all ordinary conditions so that the necessity of calling in the advice of an expert, as for instance in the constantly recurring cases of faulty refraction, may become so rare that the traveling lay peddler of spectacles will no longer find a field of operation. The expert will of course still have his place, but the family doctor will not have to so constantly acknowledge his own ignorance. Furthermore, he will add materially to his income, will increase his prestige in the community, and will become conscious of a new sense of power and self-reliance.

Pennsylvania Health Bulletin

No. 21. HARRISBURG, PA. MARCH, 1911.

PUBLISHED MONTHLY BY

THE STATE DEPARTMENT OF HEALTH

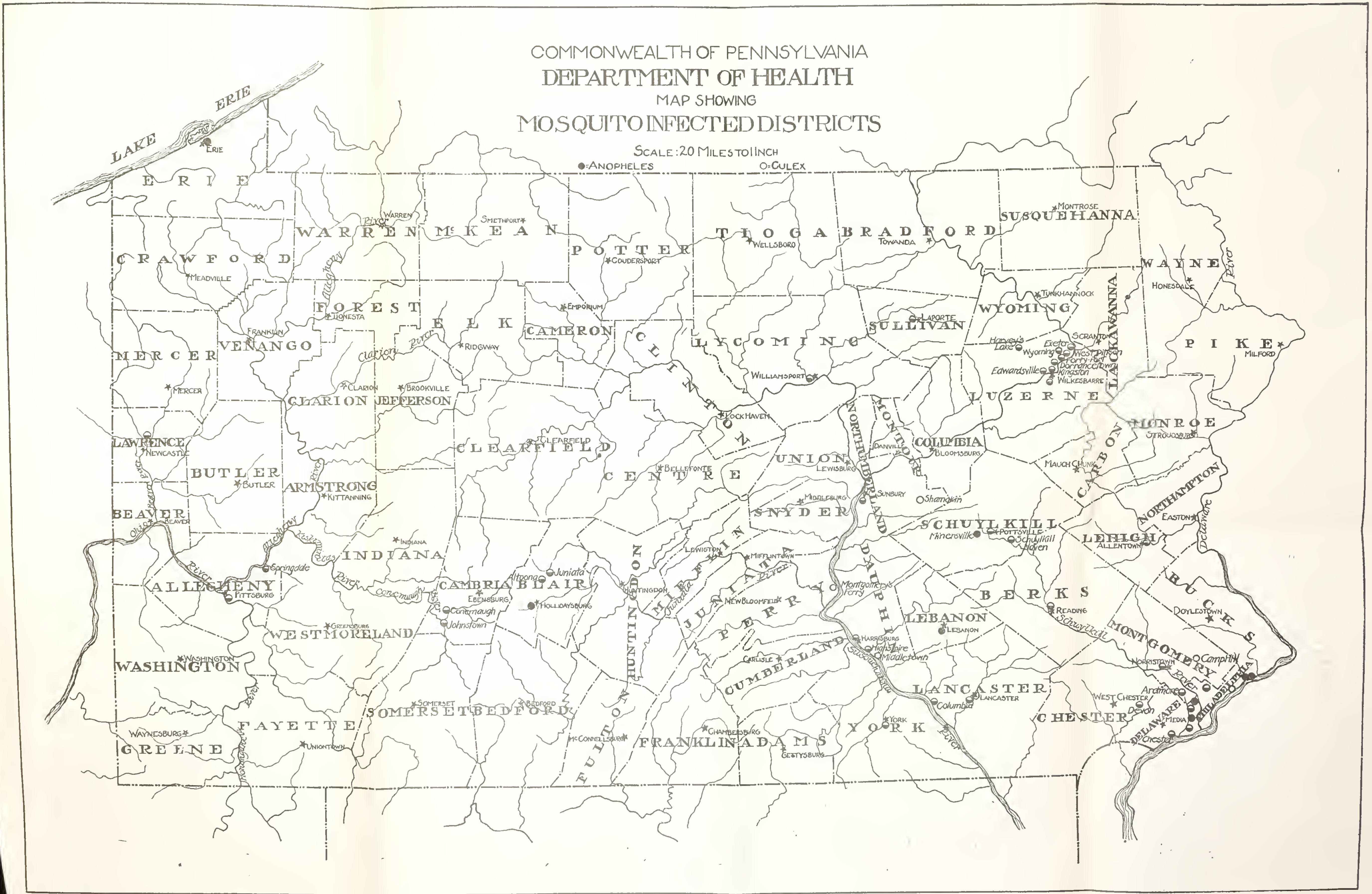
SAMUEL G. DIXON, M. D., LL. D.,

COMMISSIONER.

WITHDRAWN

Malaria: How it is Caused and How to Get Rid of It.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1911.



COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HEALTH

MAP SHOWING

MOSQUITO INFECTED DISTRICTS

SCALE: 20 MILES TO 1 INCH

● = ANOPHELES ○ = CULEX

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 21. HARRISBURG, PA. March, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

MALARIA.

How it is caused and how to get rid of it.

No one can get malaria unless bitten by a malaria mosquito. Hence the necessity for its extermination. In water, especially stagnant water, where this mosquito breeds, it is almost invariably associated with mosquitos that are merely a nuisance, of which the commonest in our State is the House or Rain-Barrel Mosquito. Since, so far as the methods of extermination go, the treatment is essentially the same for both the malarial mosquito and the nuisance mosquitoes, the destruction of one means the annihilation of the others.

Malaria still occurs in Pennsylvania and, in addition to that, mosquitoes are a nuisance in our State. Are we Pennsylvanians going to stand for their presence in our midst any longer in the face of what has been done, notably in Cuba and Panama, by men of our own flesh and blood? So far as this Department is concerned, the answer is emphatically "no." It is for this reason that the problem has been studied in Pennsylvania, so that its Department of Health might show what was to be done, and thus clear itself of the charge of being a party to the perpetuation of mosquitoes and so, of malaria. Moreover, the Department's work in suppressing other diseases demanded that malaria, too, should receive consideration and be made impossible by resorting to preventive measures to be based upon a thorough understanding of the problem as it exists in the State.

MALARIA IN PENNSYLVANIA AND OTHER STATES.

Not until 1905 was malaria made reportable in this State like other communicable diseases, such as smallpox. Since then, records of cases of malaria have accumulated, but the indications are that some time must elapse before we are given all the facts necessary to determine just to what extent the disease is prevalent. In the past no accurate records could be made owing to imperfections in the methods of diagnosis. These having been overcome, it is hoped sufficient interest will be taken in the matter to make its distribution well known. The imperfect records on file indicate that the disease is becoming uncommon. However, they also show that, from being uncommon, the disease sprang into prominence in New England after the Civil War until 1880 when it subsided, and that, in addition to this, in very recent years malaria has broken out as an epidemic, owing to the disturbance of Nature's balance of life in a marsh area in connection, in all probability, with the immigration of Italians from a malarial region in Italy.

Mosquitoes breed only in water, and only in water that is free from their enemies—fishes and other predacious animals, such as aquatic insects, or in bodies of water that are fringed or covered with vegetation that protects them from their foes.

Reviewing these positive facts, one is convinced that the breeding of mosquitoes is limited to a minimum of the water area of the State, that is insignificant compared with the total water area, and that, for this reason, mosquito breeding can be controlled and even be made impossible at an expense far smaller than the amount employed in restoring to health those who suffer through this menace to health and comfort. Further, it must be acknowledged, in view of the above facts, that in most cases the cause can be permanently removed by filling in or draining, or cleaning and stocking with their natural enemies, water areas in which mosquitoes breed, and that the application of fuel oil or kerosene, which does not do away with but only suspends the cause of the trouble, should be resorted to only until the lasting remedy can be used, or in the very few instances where lasting improvement is out of the question.

The following illustrations are intended to acquaint our people with the appearance of these enemies of mankind and to summarize more graphically the facts presented.

The first three stages are passed in the water. Combining the time that the several stages last, we see at once that nine (9) days, or possibly less, are spent in the water. Hence the necessity for applying fuel oil or kerosene (1 oz. to 10 sq. ft. of water surface) once a week to water that is not mosquito proof. The rain barrel mosquitoes spend collectively, less time in the water than the malarial mosquito, going at times through the water cycle in one week.

The Life History of the Malarial Mosquito.

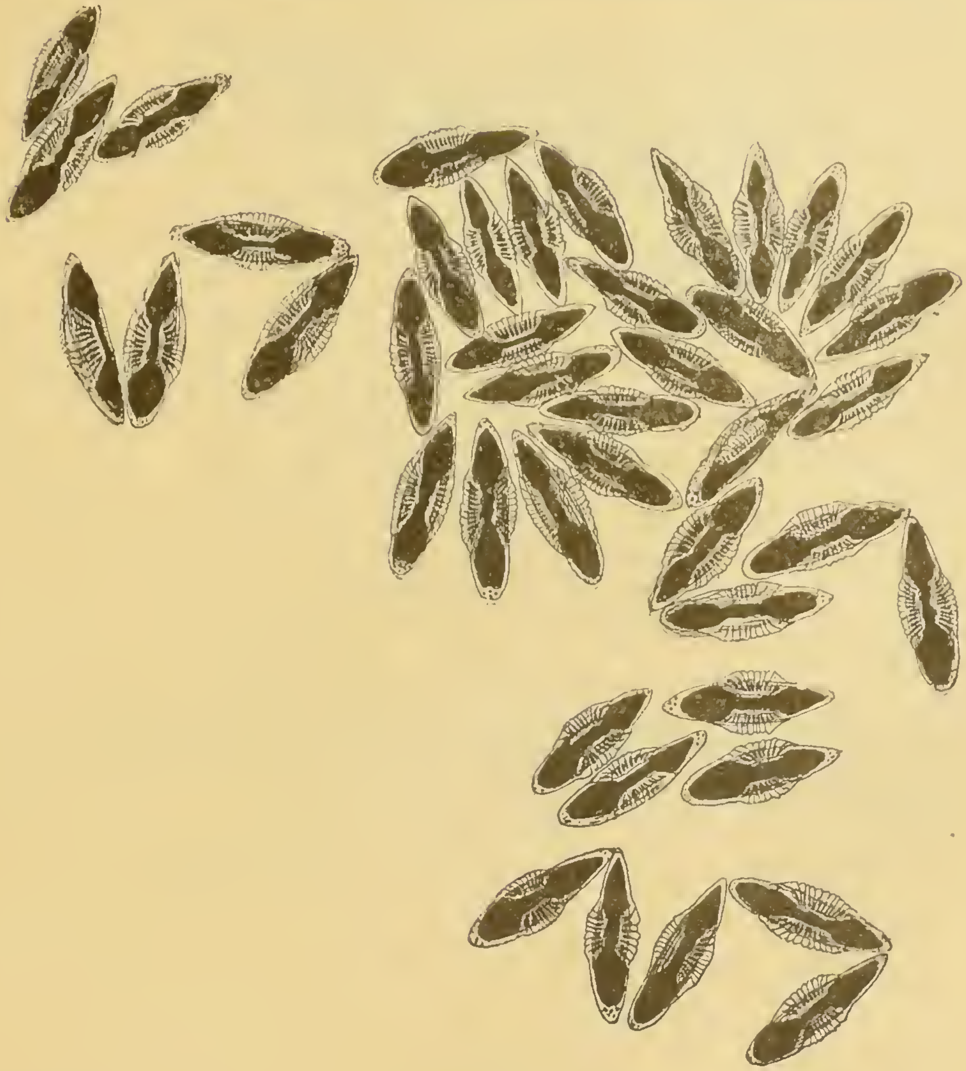


Fig. I.

Eggs as laid on the surface at one sitting. The first stage which hatches and yields the second stage two (2) or more days after being laid.

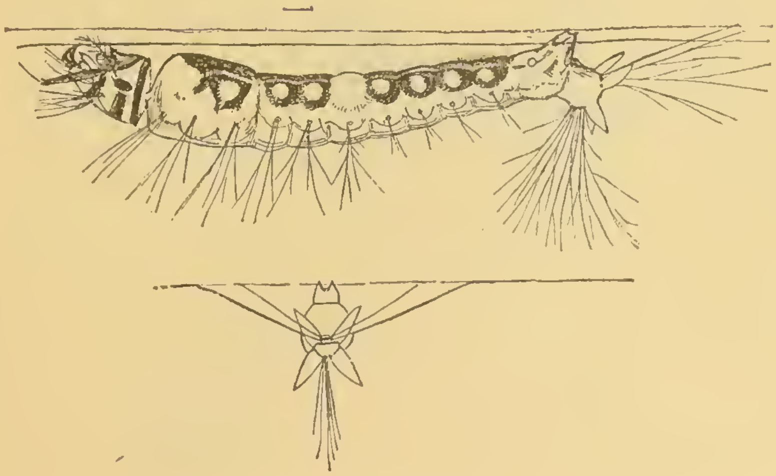


Fig. II.

Larva or Wriggler. Side and end view as it rests at the surface of the water. The second state develops in seven (7) or more days into a pupa. The short line at the top shows the natural size.

The Life History of the Malarial Mosquito.

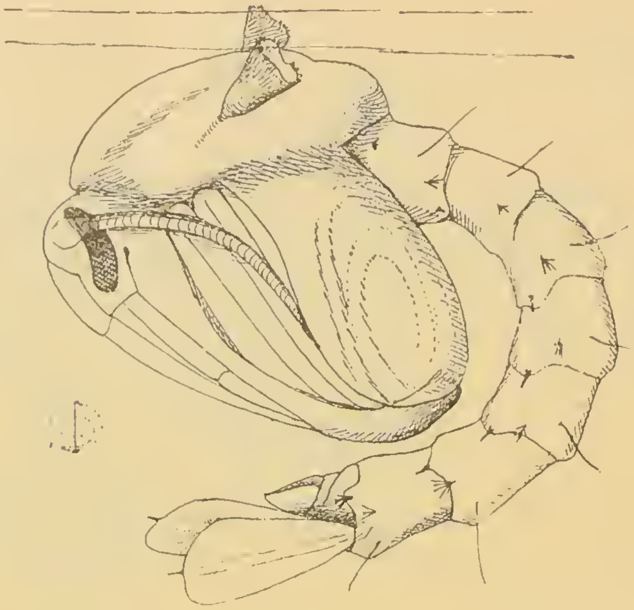


Fig. III.

Pupa or Wriggler. Side view as it rests at the surface of the water. The third stage transforms into the adult in five (5) or more hours. The small figure at the left shows the natural size.

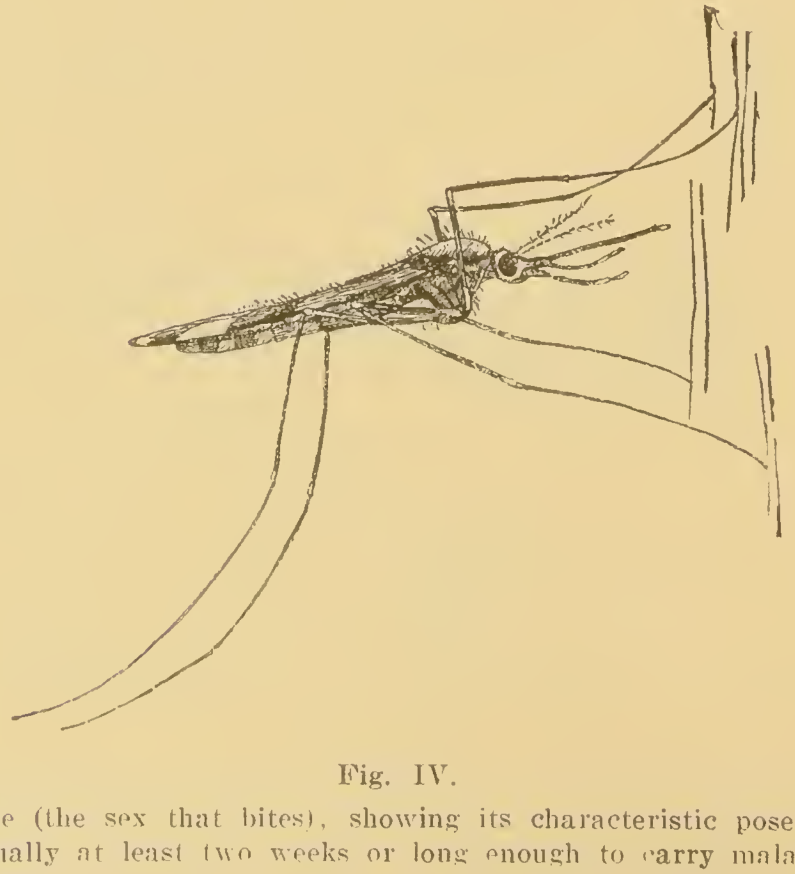


Fig. IV.

Adult female (the sex that bites), showing its characteristic pose. The fourth stage lives usually at least two weeks or long enough to carry malaria, and may live more or less dormant in protected places through the winter.

The Life History of the House or Rain-Barrel Mosquito.

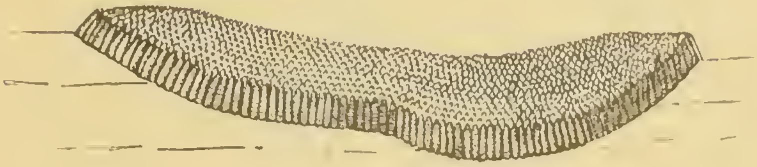


Fig. I.
Egg boat of 400 eggs laid at one sitting.

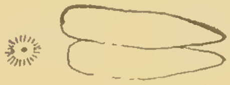


Fig. II.
Two eggs isolated and lower end of one egg at left.

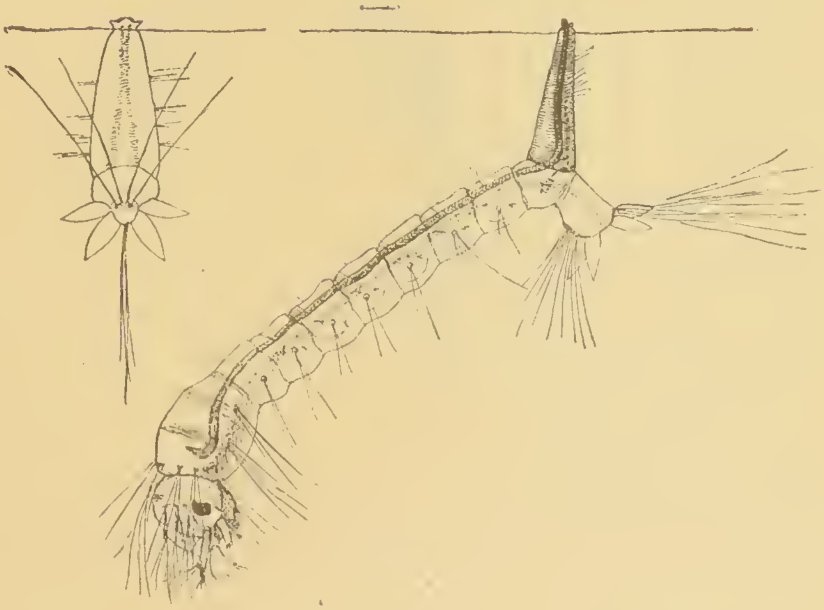


Fig. III.
Larva, side and end view as it rests at the surface of the water.
Short line shows actual length.

The Life History of the House or Rain-Barrel Mosquito.

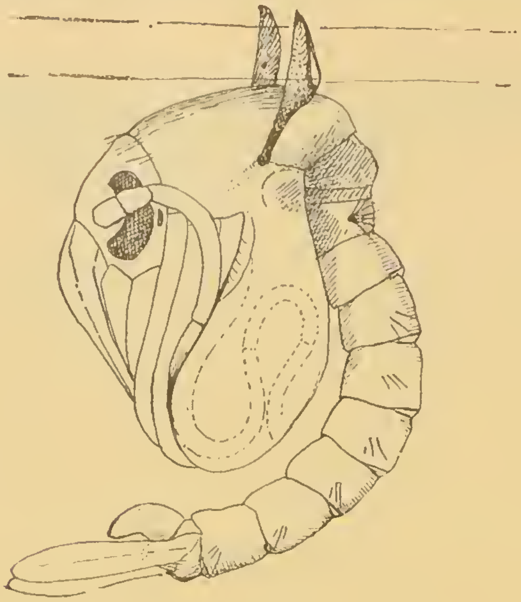


Fig. IV.

Pupa, side view as it rests at the surface of the water.

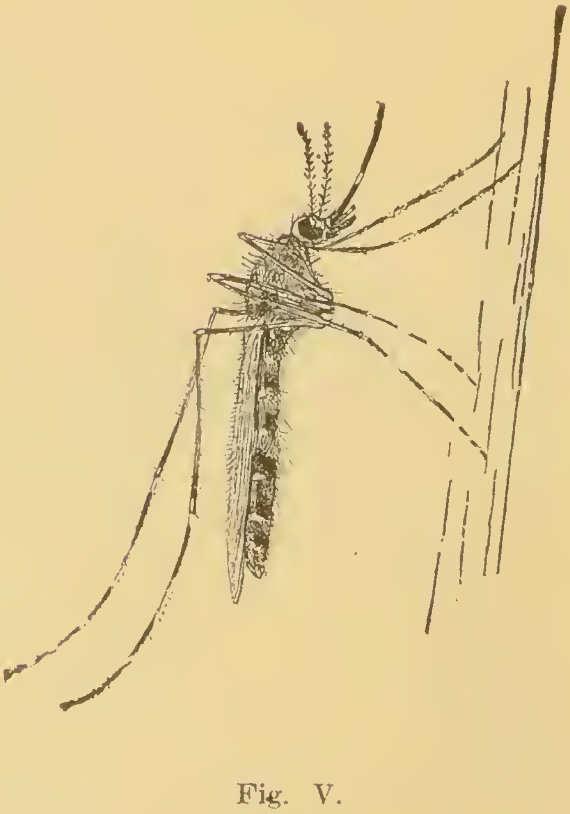


Fig. V.

Adult female showing its characteristic pose.

(These figures are of course all much enlarged. They are copied through the courtesy of the U. S. Department of Agriculture from Howard, Bulletin 25, Bureau of Entomology.)

PRINCIPAL CITIES INFECTED.

The following are the cities and boroughs where malaria has been reported:

Philadelphia, Philadelphia County.
Pittsburgh, Allegheny County.
Allegheny, Allegheny County.
Scranton, Lackawanna County.
Reading, Berks County.
Erie, Erie County.
Wilkes-Barre, Luzerne County.
Harrisburg, Dauphin County.
Lancaster, Lancaster County.
Altoona, Blair County.
Allentown, Lehigh County.
Bradford, McKean County.
McKeesport, Allegheny County.
Chester, Chester County.
York, York County.
Williamsport, Lycoming County.
New Castle, Lawrence County.
Easton, Northampton County.
Norristown, Montgomery County.
Shenandoah, Schuylkill County.
Shamokin, Northumberland County.
Lebanon, Lebanon County.
Pottsville, Schuylkill County.
Braddock, Allegheny County.

with a total population of not less than 2,541,667; and the following places, which were visited by request, for the purpose of combatting malaria in the more malarious regions, or for the purpose of perfecting the comprehensiveness of the report:

Montgomery Ferry, Perry County.
Laporte, Sullivan County.
Camp Hill, Cumberland County.
Conemaugh, Cambria County.
Middletown, Dauphin County.
Columbia, Lancaster County.
Steelton, Dauphin County.
Ardmore, Montgomery County.
Dayton, Armstrong County.
Juniata, Blair County.
Hollidaysburg, Blair County.
Springdale, Allegheny County.
Minersville, Schuylkill County.
Schuylkill Haven, Schuylkill County.
West Pittston, Luzerne County.
Exeter, Luzerne County.
Wyoming, Luzerne County.
Forty Fort, Luzerne County.
Dorrancetown, Luzerne County.
Kingston, Luzerne County.
Edwardsville, Luzerne County.
Carlisle, Cumberland County.
Harvey's Lake, Luzerne County.

with a population of 79.453.

THE DIFFERENT KINDS OF MOSQUITOES IN PENNSYLVANIA.

With the exception of the elevated parts of the northern section of the State, where spruce trees grow and the river valleys in the southern part of the State, nearly all of the area of our Common wealth has vegetation of that one kind that is dependent on certain means of temperature and moisture and is known as Alleghenian or Humid Transition Zone. Even the exceptions to this, known respectively as the Canadian Zone, or Spruce Belt, and the Carolinian Zones, are not so different from the predominating region, or Transition Zone, as to stand in the way of the distribution throughout the State of the more important mosquitoes. With these facts in mind, it is easy to understand why the malarial mosquito and therefore malaria has occurred in all parts of the State. There are, in all probability, fifty or more than fifty distinct species of mosquitoes to be found in Pennsylvania. But since the primary aim of the Department was the determination of the most essential facts in relation to the suppression of malaria, there was no reason for searching for all the different kinds, although collections were made throughout the State. Arranged in sequence, according to their morbific importance, the species that are known to inhabit, or likely to be found inhabitating, Pennsylvania, are as follows:

ACTUAL AND POSSIBLE DISEASE CARRIERS.

The Four-Spotted Anopheles. (Anopheles maculipennis, Meigen; or Anopheles quadrimaculatus, Say) The occurrence of this species coincides quite naturally with the appearance of malaria, since it is, in the light of present knowledge, the only species of mosquito in Pennsylvania that transmits malaria from person to person. This species occurs throughout the State but is, comparatively speaking, rare. It has the characteristic pose to be noted among the Anopheles in the illustration given in this bulletin, and may be distinguished from the two additional species of Anopheles found in our State by the palpi, or structures parallel to the proboscis or beak, being uniformly light brown. Its wings are devoid of any marks, excepting the four so-called spots, which are really due to a greater abundance of scales in the four different species, the scales at these points being of a darker brown than the other scales on the wings. It is these four so-called spots that have given the species its name. In the larval stage it is impossible to distinguish this species from the other two species of Anopheles or dapple-winged mosquitoes found in Pennsylvania. The species is said to fly only at night, and is capable of breeding in almost any water that will breed any kind of mosquitoes. Hence, the presence of other kinds of mosquitoes than this is to be regarded as a harbinger of malaria. The malarial mosquito is with us all the year but is active on the wing only from June until late in the Fall.

The Mottled-Wing Anopheles. (Anopheles punctipennis, Say) This species occurs rather abundantly throughout the State and breeds in the same places as the preceding, from which it may be distinguished by the wings having yellow marks, instead of the so-called dark spots. Its palpi are, like the preceding species, i. e., of one color. In the larval stage it cannot be separated from the four-spotted Anopheles. It also flies at night, and stays with us all the year but is on the wing only from June until late in the fall. With the exception of the gallinipper, or fringed-legged mosquito it is the largest species in the State. Indications are that if proper experiments shall be conducted, this species, too, may be found to carry malaria.

The day-light Anopheles (Anopheles crucians, Weidmann). This is easily recognized by the wings having more than four of the so-called spots that are found in the four-spotted Anopheles and furthermore, by the palpi having silvery rings composed of scales. The larva is not separable from the larvae of the preceding species. This species has been taken only in Chester. The indications are that it is confined to the southeastern portion of the State, but it may, in addition be found in the river valleys in the extreme southern part of the State. It seems to be rare in Pennsylvania, and nothing is known about its relation to malaria, though it may yet be shown that it, too, carries that disease.

The Tree-Hole Anopheles. (Anopheles barberi, Cocuillett.) This species has not been taken in Pennsylvania but indications are that it may be found in the river valleys of the extreme southern portion of the State during July, August and September. It may be known by the wings which are devoid of the so-called spots, and, in addition, lack any other marks excepting such as are made by the scales along the veins and along the edges of the wings. In the larval stage it may be distinguished from the other larvae by the very dark head and the short anal gills. It breeds only in the water that collects in hollowed out portion of trees. There is no knowledge concerning its relation to malaria, though this too may be a transmitter of the disease.

The Yellow Fever Mosquito. (Culex (Stegomyia) calopus, Meigen or Stegomyia fasciata) This is the species which transmits or carries yellow fever. That it has been in Pennsylvania there can be no doubt, but in view of our knowledge on the subject and the recent investigation, the indications are that this species which was introduced into Pennsylvania, certainly Philadelphia, from the tropics by trading vessels, has never become indigenous, but, in all probability, died out before the winter of the same years in which it was introduced. Our last knowledge of its presence here was in 1871. It is not a conspicuous species and may be recognized by the marks on the back of the thorax which consists of four lines composed of silvery scales, two of which extend from the anterior to the posterior edge of the back of the thorax, and running parallel to the mid-line of the latter. The other two lines are shorter and oblique, extending from the sides near the middle of the back of the thorax to a point through the posterior edge of the back of the thorax and near the parallel lines. The larva is very like one of the species of the salt water mosquitoes occurring in New Jersey. It has a very short syphon, or breathing tube, which is, approximately, two times as long as it is wide at the base.

The Rain-Barrel Mosquito, or the House Mosquito (Culex pipiens, Linneus) It is claimed that this species has been introduced from Europe. It occurs all over the State, and is especially to be found breeding in the water of rain barrels. In the adult stage, it is perhaps the commonest mosquito nuisance of the household. In the tropics it transmits a disease known as filariasis by carrying a round worm, the cause of this disease, from person to person. It in all probability, does not transmit disease in Pennsylvania, except, perhaps, in a mechanical way, as flies transmit typhoid fever. Its wings are not spotted. The legs and beak are unbearded and with the exception of the rather well defined white bands at the base of the backs of the abdominal segments, it is uniformly brown or yellowish in color. The larva, when it has completed its growth, is 28-100 to 32-100 of an inch (7 to 8 mm.) in length, and has a syphon or breathing tube, which is, approximately, as long as the thorax of the larva is wide.

GENERAL CO-OPERATION NEEDED IN ORDER TO BRING ABOUT MOSQUITO EXTERMINATION.

Since it has been positively proven that mosquitoes carry disease it has fallen to the duty of Health Officers to recommend the mosquito proofing of all bodies of water breeding mosquitoes known to them. If Health Officers had a sufficient number of inspectors to send around they could guarantee mosquito extermination, but since no Health Officer has ever been so adequately provided with agents and there is no indication that he will be, he can guarantee the suppression of mosquito breeding only in the water areas already alluded to—namely, those which he knows do exist and breed this menace to health and even to life. Thus the necessity for the most ready co-operation between the public and the Health Officers is apparent if we would actually exterminate this carrier of disease. In order to effectually co-operate the following directions should be heeded:

1. Report all water that stands for more than five days, sluggish streams, swift streams with vegetation in them or along their shores, lakes, ponds, or in fact any standing water, to the local Health Officer. In many communities where these pests prevail, as is well known, much good has been accomplished by voluntary associations under the name of Mosquito Brigades which have made this one of their duties.

2. Do not permit any water to stand anywhere for more than five days, unless it is covered tightly with cheese cloth or some other material in such a way that no mosquitoes can get at it to lay their eggs and start their breed. (The mesh of most screens and mosquito bars is not close enough to keep out certain varieties of mosquitoes).

In case you are confronted with a problem that you cannot cope with, report to the local Health Officer.

If all hands do their duty along these lines extermination may be realized.

TO KEEP THE HOUSE FREE FROM MOSQUITOES.

Thorough screening of the house with netting or wire screens having 18 to 20 meshes to the inch, will keep mosquitoes from getting indoors. Should mosquitoes get in through openings of doors and windows, or through imperfect screening or absence of screens, their numbers can be reduced or even be done away with, by the use of a paddle made of an oblong sheet of wire gauze, such as is used in window screens, 4 x 8 inches, tacked onto a strip of wood of suitable size to serve as a handle. Armed with such a weapon anyone can, by swiftly slapping the mosquitoes on the wall with a sheet of wire, soon destroy a sufficient number to make the task afford satisfaction.

Or where it is not possible to single out the mosquitoes in a room and kill them in this way, the burning of jimson weed (stramonium) and saltpetre is recommended. The space to be rid of mosquitoes must be tightly closed so that no fumes can escape for two hours. Then three parts of the powdered jimson weed mixed with one part of saltpetre is spread in a layer one-half inch thick on a tin sufficiently large to hold all the mixture necessary, or several tins may be employed. The powder is then lighted in several places and the fumes will shortly penetrate the space, provided at least eight ounces of the mixture is used for 1,000 cubic feet of space.

Mosquitoes may be repelled by the burning of Chinese punk and by the less desirable application of equal parts of olive oil and oil of citronella to the face, hands and ankles every half hour or so. Carrying napthaline or bar camphor in the pockets is also of some use in keeping mosquitoes off the person. In case one is bitten by mosquitoes the best antidote is the application of a diluted solution of ammonia water to the wound as soon after the bite as possible.

LOCAL WORK.

Since the malarial mosquito does not fly more than one-half mile from its breeding place and, apparently only rarely as far as this, it is possible for any locality to free itself of the danger of infection with malaria, by bringing about a crusade against mosquitoes within its own territory and for one-half mile around the same.

DIFFERENT KINDS OF POSSIBLE BREEDING PLACES, MARSHES AND SWAMPS.

In their natural condition such collections of water are so well provided with foes of the mosquito, such as water beetle and water bug larvae, dragon flies, swallows, night hawks and bats, that epidemics of malaria may not appear through them. But, as soon as the natural condition is interfered with, by an interference with drainage, etc., by the building of roads, or through other improvements in these locations, malaria may set in, as it has set in on previous occasions. So, marshes and swamps must be carefully watched, and especially near growing towns they should be drained. Such drained marsh lands yield sufficient income to make their drainage profitable. Under some conditions it might be more expedient to create a lake or pond, into which a surrounding marsh could be drained. If so, the resulting pond would need to be cared for by stocking with fishes and other methods, in order that it might not in turn become a mosquito breeder.

CROTCHES AND HOLES IN TREES.

Water holes in sides of trunks of trees made by decaying branches or otherwise, and crotches of trees may harbor enough of the disease carriers to become of importance. Should the trees be too healthy to be destroyed, these cavities need only to be filled up with cement to make them harmless.

SPRINGY GROUND.

Land under which springs are situated is usually in good condition to favor the formation of puddles. Such ground should have its springs located and drained through drain pipes, or in some other satisfactory way.

SPRINGS.

These afford but scant breeding area for mosquitoes and can be walled in and covered effectively by a lid made of light wooden frame, over which some inexpensive cloth has been stretched, such as cheese-cloth or muslin.

PONDS.

Unless these are to be preserved for ornamental purposes, they should be drained or filled in. Should they, however, remain, then it becomes necessary that they be stocked with small fish, such as sunfish. Furthermore, their surface and edges should be kept free from vegetation that defeats the good offices of the fish by sheltering the mosquito wrigglers from their attacks.

LAKES.

These are usually in such a state of natural balance that few, if any, mosquitoes breed in them. Such mosquitoes as do find a home in lakes, as a rule, find it along the edges and surfaces where plants have grown up that afford protection and food to the mosquito wrigglers. What has been said about ponds, is therefore, with one exception, applicable here, but there are probably few instances where it will prove profitable to fill in or drain a lake.

STREAMS.

These offer less work than other bodies of water in order to make them mosquito proof, since all that is necessary is to see to it that the edges of the stream are kept free of vegetation that would harbor wrigglers, and furthermore, that the bed of the stream shall always afford sufficient pitch to enable the water that passes through to do so as completely as possible. Where the stream is subject to puddle formation during droughts, and it is deemed too expensive to give sufficient pitch to drain off all water, the temporary pools should be oiled, as elsewhere described, until all the stream is normal again.

HOOF PRINTS.

These are to be found chiefly in soft ground and often disappear before the drain pipe or drainage ditch.

WATER CRESS BOGS.

These are, as a rule, fairly mosquito-proof, and where the bog is well cared for there ought to be a sufficient number of the natural enemies of mosquitoes to keep down the occasional wriggler, that, in our experience, constitutes the sole wriggler population of the water-cress bog.

NURSERY PONDS.

These should be, as far as possible, treated in the same manner as ordinary ponds, barring, of course, the allusion to drainage and filling in the same. Where plants are grown that protect mosquito wrigglers from their natural enemies, the pond should be so constructed as to permit occasional flooding for short periods during which the fishes can get at their prey. Furthermore, the less dense growths of plants, the less chance there will be for the mosquito wrigglers to evade their natural enemies.

ORNAMENTAL PONDS—LILY PONDS.

In so far as they have plants in them that afford protection to wrigglers ornamental ponds should be treated in the same way as nursery ponds.

WELLS.

Mosquitoes also breed in wells. There is one well on record where, at a depth of 119 ft. the surface water had wrigglers in it. They should, therefore, be so topped as to make it possible to cover them in the same way as springs.

CANALS.

Well kept canals are practically mosquito-proof. What has been said about streams, may in some cases, be applicable to canals, but further than this, they offer no difficulties, excepting when they become totally abandoned, in which case in default of being restored to usefulness, they should be treated as ponds are treated. Where permanent abandonment is expected, drainage or filling in is the solution, and should be insisted on. There are many places in Pennsylvania where an abandoned canal has rendered a neighborhood malarial, and seriously impaired the health of the community.

VACANT LOTS.

These and imperfectly drained lands of all kinds, where puddles and temporary ponds or bodies of a more or less persistent character may form, should not be tolerated, for it is in such that mosquito-breeding becomes intense, and, furthermore, such places are anything but pleasing to the eye, and nuisances in more ways than one. Their situation, and in fact everything about them makes their destruction a feature of every community's house-cleaning. For any community to permit them to exist, is to invite just criticism, both on account of their unsightliness and their danger as breeders of disease. Drainage, or better, grading or filling in are here the needs. Until this is done, and it should be done as soon as possible, oiling should be resorted to, but the oiling must not be looked upon as a permanent cure but only as a make-shift between a condition and its known and possible permanent cure.

RESERVOIRS.

Most of these, it is assumed, are mosquito-proof. Such of them as are not can be made so by applying the same treatment as is applied to ponds.

TIN CANS AND OTHER UTENSILS THAT HOLD WATER.

Much of this sort of encouragement to mosquito-breeding will disappear with the "vacant lot nuisance." It need hardly be added that all worn out vessels such as tin cans that are thrown away should be buried or be so crushed as to make them harmless from the mosquito standpoint, since it is nothing less than criminal negligence to let them stand around to catch rain water and breed, not merely nuisance mosquitoes, but disease-bearing mosquitoes as well.

PUDDLES.

These are usually of no great consequence, and can readily be done away with simply by filling operations or grading.

DITCHES AND GUTTERS.

If these be kept free of debris and vegetation and so pitched that the water in them may run off, no breeding of mosquiteos will take place in them.

WATER TANKS, CISTERNS, RAIN-BARRELS AND SIMILAR RECEPTACLES.

Such of these as are a positive necessity should be covered in the same way as that recommended for springs, if they are open and harbor mosquitoes, as is usually the case.

WATER TROUGHS.

If used every day, there is little, if any, trouble to be expected from this source. When out of use, say, for more than a week at a time, the water in them should be changed each week, which procedure will cut off the mosquitoes that may have become established.

CHOKED SPOUTS.

These may bring about pools on roofs where mosquitoes may breed until detected by accident, or only after a search for the possible cause of the nuisance or even menace to health. Owing to the difficulty in the way of the regularly appointed authorities in ferreting out defects like this, every member of the community must be asked to report such defects, should he come across them in his daily walks.

HOUSE-BASINS, ROAD BASINS, SEWERS.

The proper procedure with these is either to drain them completely or change the water in them each day. Where these requirements cannot be met, oiling once each week is recommended.

CESSPOOLS.

Here oiling once a week is recommended, awaiting the installation of a drainage system that will more radically effect a remedy of the evil.

Some of our small towns, where cesspools are still the rule, have these and these alone to blame for the presence of mosquitoes in their midst. The mere fact that the mosquitoes breed in such vile surroundings in this instance ought to make every householder eager to co-operate in extending the preventive measures above outlined.

TO HASTEN THE OBLITERATION OF MOSQUITO BREEDERS.

Many, and sometimes all, of the most extensive and intensive mosquito breeding areas in or around cities and towns or in a given locality are so situated that in the course of local improvement they will be done away with through grading or drainage. In the meantime such places are a menace to health and a positive nuisance; hence every effort should be made to have them drained or filled in, as the condition may demand, as soon as possible.

Should filling in be necessary much can be accomplished by securing in one way or another the co-operation of all parties who have ashes or dirt, to dispose of, and diverting this material to the mosquito breeding areas which are to be filled in. When the filling in is started the material should be delivered so that the edge of the pool will be the first portion to disappear under the material. Further, the material should be added in such a way that the entire pool will be obliterated in the shortest possible time, which means that the material is to be spread out, first, to a depth that will leave no chance for pools to form.

The smallest reasonable time limit should be granted in which a permanent cure is to be effected, but until the permanent eradication of the breeding areas takes place through filling in or drainage, the surface of the water must be covered with crude oil or kerosene once every week, with an application of one ounce of oil to every 10 or 15 square feet of surface.

The following out of the above suggestions will bring about prompt and permanent cessation of mosquito breeding in the locations that are known to the Health Officer, Sanitary Inspector and other officials.

In order to more completely do away with mosquito breeding the co-operation of every householder must be invited and tenants must be directed either to remove all standing water or to screen it so completely with cheese cloth or some other material that this will effectively keep mosquitoes from getting at the standing water.

Since, so far as our knowledge of Pennsylvania mosquitoes goes, only the region in the extreme Southeastern portion of the State receives immigrant mosquitoes from over a distance of 30 miles, co-operation with communities for from one-half to one mile outside of any one community will be sufficient to reduce mosquitoes to a minimum if not to the point of extermination. Bear in mind, however, that no collection of water is too small, and few are too shallow to permit of mosquito breeding.

A SCIENTIFIC ANTI-MALARIAL CAMPAIGN AND ITS RESULTS.

While as we have said no one can have malaria unless bitten by a mosquito, on the other hand it is as certainly true that no mosquito can communicate malaria unless it has been infected by biting a human being suffering from malaria. Hence the problem of the prevention of malaria is a two-fold one. First we must prevent the mosquito from biting a person sick with malaria, and second we must prevent this same mosquito, if she has become infected, from biting a well person. This problem is again two-fold. We can either prevent the mosquito from reaching a sufferer from malaria or we can destroy the malarial germ (plasmodium) in the blood of the infected person. Is this latter scheme practicable? Entirely so. The drug known as quinine possesses the power, when introduced into the human system, of entirely neutralizing the malarial poison, of killing the germ. Hence these three measures must go hand in hand. We must prevent the well mosquito from biting the malarial patient by surrounding the latter with screens. We must destroy the germ in the patient's blood so that if the mosquito does bite him it shall not become infected, and finally we must prevent the accidentally infected mosquito from biting a well person. And the only way in which this last can be done is by killing the mosquito and exterminating the race. All scientific efforts to banish malaria are conducted on these four lines. In Algeria a terribly malarial-infected country, the French Army has been for many years conducting an active and successful anti-malarial campaign. But the most conspicuous and most successful effort of this kind now before the world is that of the United States in the Canal Zone of Panama.

The report which this Department has received through the courtesy of Col. Gorgas, the Chief Sanitary Officer, for the month of

January, 1911, contains a chart which shows that while during the month of November, 1905, the working force was actually decimated by malarial illness, in the Spring of 1910 the number of those thus invalided had fallen to less than one per cent. Is it necessary to look farther for the cause of the success of the American enterprise as compared with all former attempts? The deaths from disease in January, 1911, amounted only 5.07 per 1000, annually, a better showing than can be found anywhere in the United States. The amount of quinine issued during the month was 436.51 pounds avoirdupois.

Pennsylvania
Health Bulletin

No. 22. HARRISBURG, PA. APRIL, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

HEALTH.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER.

No. 22. HARRISBURG, PA. APRIL, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

HEALTH.

What a different world is this seen through the senses of the healthy man from that seen through senses dulled by disease.

As he rises from his slumbers he feels refreshed and delights to see the new day that has just over-come the night. The song of the birds calling to their mates is sweet in his ears. He looks forward to his daily labors with a heart full of good cheer. Breakfast is relished. The dishes prepared by the housewife or the cook are delicious to his palate. He enters upon his daily work with a clear brain and a steady hand. The engineer, after looking over his locomotive, jumps into the cab and seizes the throttle with a strong grip and a mind intent upon the track. The mother washes and dresses her little brood singing as merrily as the robin in the tree, and looking forward to a day of joy in their sweet care and companionship. The banker finds that the problems and anxieties which oppressed him when he laid his weary head upon the pillow have slipped away, leaving his mental vision clear and unobstructed. Even the physician, profiting, through long habit, by the brief hours of sleep allowed him by his exacting patients, finds his cases looking more hopeful and that he has gained a new insight into their perplexing maladies while he slumbered. And so under the touch of the magic wand of the bright eyed goddess of health, the good old world goes spinning merrily around on its daily course.

The traveller speeds safely on from city to city towards his destined goal without a hindrance or a thought of danger, knowing that there is a firm hand and a steady eye on the engine. The happy children bubble over with the mere joy of living, repaying the tender mother a thousand fold for her fostering care and giving a promise of a noble race. The business world bravely and blithely pursues its manifold occupations. Under the stimulus of finance, wheels turn, machinery hums, the keel ploughs the foaming sea, even the air itself is rent by the sweep of the air ship and life becomes indeed worth living.

But let sickness paralyze the hand and pain wring the brow—then how different the awakening. All nature is shrouded in a pall. Gone is the zest for food. The languid muscle is vainly urged to its accustomed task. The confused brain shrinks from the daily problem. The care of the child becomes a burden insupportable. The sunshine loses its brightness, the landscape is dull and deadly, and the sounds of commerce and industry distress and annoy. The singing of the birds and the prattle of children only grate on the sensitive ear. Business problems look hopeless, the country is going to the dogs and life is a slough of despond.

And yet it is the same world, the same people, the same views of plain and sky, the same industries, the same pursuits. The difference all lies in the ego behind the cornea and whether that ego is vital with health or dull with disease. The only attribute that will brighten the eye through which the ego looks out upon the world is health.

But after all why paint imaginary pictures of the world as seen through the eye of disease as compared with that of health when history has blazoned the story over and over again, emphasizing the contrast in the most emphatic manner on almost every page.

How did the world look to the ancient Greek, in whose veins coursed a healthy blood, whose muscles were hardened by daily athletic exercises, and whose skin was rendered active and his joints supple by the frequent bath and the manipulations of the masseur, who in short was the embodiment of health and worshipped at the shrine of the lovely divinity, Hygieia? Witness the marbles of Phidias and the paintings of Appelles and the poems of Homer and Sappho. The world was to him full of objects of delight and forms of beauty. His senses were alive to every source of enjoyment offered by nature. "Rosy fingered Aurora, child of the morning," aroused him from balmy slumbers to days full of joy. The purple hills, the many sounding sea with its sparkling waves, the flower sprinkled meadow and above all "the human form divine," never before or since so perfect a reflection of divine perfection—to all these he was receptive and responsive. So beautiful did his own land appear in his eyes that he was ever ready to lay down his life in its defence and his sword drawn in the sacred cause of country and liberty availed against that of a hundred servile foes. But the modern Greek. How looks the world in his eyes? Centuries of malarial poisoning have shriveled and torn and mangled his red blood corpuscles until that life giving fluid has become weak and pale and devitalized. His face is anemic and his glance has lost its fire, he looks out on a land of crumbling fanes and ruined temples, he finds nothing to arouse his ambition or inspire his patriotism. He bends his neck to the truculent Turk or if, for a brief moment he attempts to assert his independence, the sword soon falls from his nervelass grasp and he sinks back into apathetic despair. He has no eye for "the glory that was Greece," and sees in the Acropolis only a place where he may pick up chance drachmas from passing travellers. His loftiest aim to fleece the unsuspicious tourists, who flock to his shores, or, forsaking his native land, to embark in some second rate commercial enterprize in a foreign country.

What was the outlook of the French exploiters of the Isthmian canal? With fevered brain and with poison coursing through their veins, the gorgeous skies and glorious bloom and verdure of the tropics were to them lurid with flames of death and destruction, the long trains of weary laborers were but funeral processions and the screech of the steam whistles was as the yell of demons. Dying hopeless in a land of horrors, an ocean between them and their loved homes, their only monument is a half dug ditch, a few rusting locomotives and dismantled dredges and the pile of bones which the old grave-digger of Mount Hope Cemetery, Panama, with his necklace of grinning sculls, unceasingly brings to the light of day. Mount Hope, well named; for is it not indeed the Cemetery of buried hopes? But how different is the Isthmus seen with the alert eyes of Goethals and Gorgas. The same burning sun beats down upon the toilers, the same rank growths line the stagnant streams, save in the narrow zone which their joint efforts are reclaiming, but the hosts of labor go forth to their daily work full of courage and zeal and good cheer. Their giant task is not too great for their lofty ambition, backed by strong nerves and clear brains, and they look forward with all the keen delight of anticipation to the day when as the result of their efforts the nuptials of the Atlantic with the Pacific shall be celebrated before the gaze of an admiring world.

How did the world of civilized Europe look to the eyes of the overworked and despairing physician before the days of Jenner? To him it was one vast charnel house. Hear his own words as rendered from the German: "One has but to witness the fearful progress of a few cases of this (small) pox, as it frequently appears, to appreciate its horrible character. True a few cases terminate favorably, but in the great majority of instances how terrible are the consequences both to the victim and his household. With dread we view the approach of the disease. Our whole nature rises in revolt against the introduction of the poison into our system. Fever, convulsions and raving delirium bear witness to the internal upheaval. If the patient lives through much suffering and distress, to the period of pustulation, fever again ordinarily sets in. The monstrous swelling of the head, the closed up eyes, the innumerable pustules on the entire body, each one producing excruciating pain, these and a hundred other tortures are not exceptional but usual. We who are looking on can appreciate the mad ravings, the convulsions, the grinding of the teeth, the sweating of blood, the corpse like stench of the still living body and other horrible manifestations of this natural pox; but who can depict the inward suffering? Who, the agony of a human being whose entire surface, clad as in a black coat of mail, attacks the inner life, sends the poison to the vitals and at last after a long and painful struggle, brings the heart to a standstill? The poor children tear their cheeks with their nails in their anguish, only to succumb to apoplexy or strong convulsions or as often happens to most distressing suffocation. Such is the course of the natural smallpox in 400,000 human beings in Europe every year."

In the same country today what does the physician see? Instead of crops ungathered, villages depopulated, industry at a standstill, cities surrounded by pest houses, and streets full of mourners, now he looks out upon an empire without a single smallpox hospital, occasionally, in a ward of a general hospital, a solitary case of smallpox, probably imported from another country, creating no alarm because all the other patients are protected by vaccination, a whole people absolutely freed from that awful dread, not a single blear-eyed, smallpox-pitted face to be met on the streets; harvests stored, barns overflowing, a happy, busy and prosperous, because, in the main, a healthy people.

Naaman, the Syrian, high in the royal service, housed in a palace, clad in purple and gold, surrounded by flattering slaves and fawning favorites, has no eye for the beauty of women, no ear for the charm of music,—the wine cup no longer gladdens, the choicest viands are apples of Sodom in his mouth, even the lust of power has lost its lure. His future is but a mournful vista of desolation. Better death, for is he not a leper? But he heeds the prophet's voice and bathes thrice in the waters of Jordan. (So reads the sacred page.) And instantly he is in a new world. The sunshine is again bright, the perfume of flowers is sweet in his nostrils, women are once more beautiful in his eyes, and his ear delights in sweet sounds, his slaves bow before him and he rejoices to feel himself their master. For his leprosy is cleansed, and a pure blood races through his veins. A single moment has sufficed to change the world for him. But it is a waste of time to multiply historic instances. That mind is indeed dull, it may be sick which cannot out of the store house of its own memory recall them *ad infinitum.*

Pennsylvania Health Bulletin

No. 23. HARRISBURG, PA. MAY, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH

SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE COMMON FLY.

How it Develops, why it must be Destroyed and how to Destroy it.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911.

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 23. HARRISBURG, PA. MAY, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

THE COMMON FLY.

How it Develops, Why it Must be Destroyed and How to Destoy it.

The Fly Itself.

The House Fly (Musca Domestica) lays about one hundred and twenty white, elongated, cylindrical eggs, a little smaller and more pointed at the anterior end than at the posterior. They are from .04 to .05 of an inch in length and about .01 in diameter. In shape they are more or less like slender grains of wheat, having a groove on the side. The eggs are usually deposited in masses; heat and moisture are required for their normal development and they hatch in about twenty-four hours after being laid. The freshly hatched larvae or maggots are .07 of an inch in length, tapering or pointed at the one end and blunt at the other. When fully grown they are from .25 to .40 of an inch in length. They molt or change their skins three times and the entire life of the larvae is from five to seven days. After the third molt it changes into an inactive or resting stage called the pupa. This is a small elongated, brown, segmented object, rounded at the ends, and contains the chrysalis. This latter stage lasts from five to seven days, when the fly (imago) or perfect insect appears. There may be from eight to fourteen breeds annually, depending upon climate and other features. It has been calculated that the progeny of a single female fly might be 14,067,792,000,000,000 individuals at the end of the twelfth generation, provided they should all live. They breed in the crevices of warm or moist horse manure, in decayed vegetables, decayed meats, cow dung, fowl's dung, human excrement, ashes contaminated with decayed vegetable or animal matter, in rags soiled by such materials and in the crevices of decayed wood. The vast majority of them, however, breed in horse manure.

Horse manure bears nearly the same relation to the house fly that stagnant water does to the mosquito. If the fly were prevented from ovi-positing in manure and similar substances this pest would be to a great extent a thing of the past. To accomplish this, no filth or decaying matter of any kind should be allowed to accumulate. Alleys should be kept clean and free from all such materials. Stables should have hard and smooth floors and be kept clean so that there is no place for manure to accumulate. The latter should be either removed and utilized at frequent intervals (twice each week) or stored in fly-proof bins or screened apartments. A good plan is to ram it tightly into barrels that can be covered in such a way as to prevent access or egress by flies. In towns and villages a good plan is to have the manure collected twice each week as is done with garbage and ashes. When used in the open as a fertilizer it soons dries and disintegrates, ceasing to be a breeding place for flies.

How The Fly Causes Disease.

Until recent years it was the current belief that the house fly was solely a beneficent insect, owing to the fact that in its larval or early stages it destroys effete and offensive substances prejudicial to the health of mankind. At the present time on the contrary it is known to be a dangerous enemy and every effort should be made to destroy it. This insect conveys causes of disease in a purely mechanical way by carrying germs on its feet, hairy legs, sucking proboscis or mouth parts. It has the habit of alighting on all kinds of substances, particularly food and excrementitious matter and in this way is a medium for the direct transmission of the germs of disease from the latter to the former. If it were not possible for man to get rid of the waste products which are destroyed by flies in some better way, flies would be necessary, but owing to their disease carrying tendency and their great danger to humanity it becomes necessary for human beings to destroy these effete substances themselves and not leave them to the maggots or fly larvae to destroy, in a most dilatory way.

The diseases disseminated by flies are caused by microscopic plants called bacteria and popularly known as germs. When taken into the human body these germs are liable to produce the different diseases of which they are the specific causes.

The body, feet and legs of the fly are very hairy and are also well supplied with bristles. Every fly is estimated to possess twelve thousand minute feet hairs that exude a slimy fluid. On these hairy legs it may carry as many as 6,600,000 bacteria. When walking on a rough surface it clings by the aid of two minute hooks and when on a smooth surface like glass it uses an organ known as the pulvillus which secretes a fluid. The tongue is rather long and flesh-like and is admirably adapted for picking up and conveying germ laden matter.

The key to the situation is prevention. Eliminate the breeding places, destroy the larvae or maggots, exclude the flies from the home and food and destroy those not excluded.

Some of the Diseases Caused by Flies.

In the rural districts, in camp life, and to a lesser degree in towns and cities, the house fly is an active agent in the transmission of Typhoid or Enteric Fever. This disease is caused by a bacterium known as Bacillus typhosus and this causative agent is thrown off from the body of the patient in the fecal matter and urine. If house flies settle on material containing these germs of disease and then rest and feed on the food of human beings the latter are very likely to acquire the disease. This is a most direct and virulent method of transmission. During the Spanish-American war less than three hundred Americans were killed in battle while nearly five thousand died of disease, the greater number from typhoid fever which could largely be accounted for through the transmission by house flies.

They are not only agents in the causation of the germ diseases produced by the introduction of germs into the digestive tract through our food but also convey germs to and from open wounds. Dr. Joseph Leidy, former President of the Academy of Natural Sciences of Philadelphia, first made the suggestion that much of the Hospital Gangrene which carried off our soldiers during the civil war originated in this way.

They are a great source of *milk contamination* and thereby a factor in the causation of *Intestinal Diseases* of *Children*. The latest belief of science is that it is not the heat alone that causes the frightful Summer mortality among infants and children but to a large measure the fly and the criminal carelessness of man in failing to prevent a fly's birth. Intestinal disease is more frequent wherever and whenever flies are most abundant and they and not the heat of Summer are the active agents in its spread.

House flies have long been suspected of being factors in the dissemination of *Cholera*. That they contaminate food from the vomit or dejecta of those ill with the disease in times of epidemics is undeniable. The worst cholera months are those in which these insects are most abundant.

They also carry *Tuberculosis* by settling on sputum containing the cause of the malady—the bacillus tuberculosis—and then infecting food. They will also feed on sputum and a number of observers have shown that ingested sputum encloses virulent tubercle bacilli in fly specks (excrement) and that the bacilli may remain virulent several weeks while thus protected. Pus from discharging sinuses and fecal matter from tuberculous patients are also sources of danger in this respect. The importance therefore of having all Hospitals and especially Hospitals and Sanatoria for tuberculosis absolutely fly-proof and of removing all sources of fly production as far as possible from them cannot be too strongly insisted upon.

At the moment of going to press with this bulletin Doctor Simon Flexner, of the Rockefeller Institute, makes the announcement that he has experimentally demonstrated that flies contaminated by feeding on spinal cord removed from monkeys inoculated with the virus of poliomyelitis and recently paralyzed harbor the virus in a living and infectious state for at least forty-eight hours. This is not necessarily the limit of the period of survival of the transmission indicated. We are therefore warranted in adding this most serious infection to those which the fly is capable of conveying.

How to Prevent Flies from Carrying Disease Germs.

No privies or toilets accessible to flies should be permitted. Fresh unslaked lime or, if that be not obtainable, kerosene should be sprinkled freely in the privy vaults. Excreta from persons suffering from intestinal diseases should be carefully disinfected immediately on discharge from the body. In seacoast or river towns there is great danger along the shores and about wharves where excreta are not properly cared for and where flies are abundant. This was demonstrated incontestably by a special sanitary investigation undertaken by the Merchants' Association of the City of New York to determine the cause of so-called Cholera Infantum and Summer Complaint.

All garbage, kitchen slops and waste should be kept carefully and tightly covered until removed and destroyed. Fresh unslaked lime or kerosene should be sprinkled over garbage and the containers should be cleaned every day. The ground immediately around the containers may be treated in the same way.

How to Care for Cuspidors.

Cuspidors filled with sawdust or sand, are insanitary. They should be cleaned every day, using a disinfecting solution made by adding one-half ounce of Chlorinated Lime (chloride of lime or bleaching powder) to one gallon of water, or three teaspoonfuls of Liquor Cresolis Compositus or three teaspoonfuls of Creolin, or eight teaspoonfuls of a solution of formaldehyde (at least 37½ per cent.) to a pint of water. The solution of formaldehyde is preferred. Any one of the last three named solutions may be sprayed (by using a pump spray or atomizer) into the crevices of decayed wood and into open joints in furniture. A small amount of one of the solutions should be kept in cuspidors.

How to Exclude Flies from Food.

Flies should never be allowed to settle on food of any kind.

Various kinds of food stuffs exposed for sale on the street are potent sources of danger since they are liable to be contaminated by flies which have walked or fed on sputum expectorated on the sidewalk. Feather dusters are used by the venders of fruit to brush off the unsightly part of the day's accumulation of street dirt, dried sputum, fly excrement, dessicated horse manure and other offensive materials. What the brushes miss the purchaser eats. Such exposed foods should be avoided by those having regard for untoward consequences. All houses should be screened before fly time. All food, especially milk, the baby's bed and the baby's bottle and every person ill with typhoid fever, scarlet fever, diphtheria and tuberculosis, should be screened. Houses near the railroads should be well screened as flies contaminated with excreta from passing trains may gain access to food in the kitchen and dining-room.

How to Destroy the Fly Itself.

Various methods have been devised for the destruction of flies, such as paper and wire traps, poison papers and various powders and solutions.

A piece of fine wire gauze eight inches long and five inches wide, tacked to a wooden handle fourteen inches long, makes an effective beater for striking and killing the fly.

Pyrethrum powder heated in a pan or on hot coals, so that it smoulders but does not burn, gives off a dense white smoke that will stupefy flies but is otherwise harmless; one ounce to every one hundred cubic feet of air space should be used and the flies promptly swept up and destroyed. The best results are obtained if the room is darkened, leaving only a ray of light to enter at the window shade.

A solution made by adding two teaspoonfuls of formaldehyde to a pint of water sweetened with sugar and placed in saucers throughout the house will destroy many flies.

Another efficient method is by using a mixture of equal parts (by weight) of carbolic acid crystals and gum camphor. Liquefy the carbolic acid crystals by gentle heat, break up the gum camphor into small pieces and pour the liquid acid slowly over the camphor. The acid will dissolve the camphor completely and the resulting liquid is permanent and only slightly volatile at ordinary temperatures. It volatilizes rapidly, however, in a shallow tin over the flame of an alcohol or other lamp and the vapor is death to flies. Three ounces will suffice for one thousand cubic feet in a tightly closed room and it will require about half an hour to evaporate that amount. The vapor is not poisonous to man, is not destructive to materials or fabrics and is disinfectant in quality. It is not explosive but is inflammable and should be used with that fact in mind.

The house fly problem at the present time demands the awakening of the people to the exigencies of the case and to the necessity of the adoption of vigorous preventive measures. The expense incurred to prevent disease from these sources would be vastly more than justified by the results obtained.

SUMMARY.

First: Flies can only breed in *filth* of the kinds mentioned and their presence is evidence that such material is close at hand.

Second: They carry the cause of disease on their hairy *bodies* and *legs*.

Third: Keep them away from the *sick*, particularly those suffering with a communicable disease.

Fourth: Do not allow them to settle on the *mouth, eyes, ears* or *nostrils* of *infants*.

Fifth: Do not permit them to come in contact with *food* of any kind or to settle on the milk bottles of infants.

Sixth: *Open privies* or *shallow cess pools* are particularly dangerous. Sanitary closets should be used.

Seventh: *Uncovered* or *unscreened garbage* cans and open drains should not be permitted.

Eighth: Physicians should see that the *excreta* of all persons ill with intestinal disease are disinfected and cared for in accordance with the regulations of this Department.

Ninth: *Manure* should be collected *twice* a week and spread on the fields or stored in fly-proof receptacles and composted.

When horses are kept near a residence it is good economy to build a pit for the manure along the lines of that designed by the Pennsylvania State Department of Health and shown in the accompanying sketch. This prevents flies from infecting a neighborhood.

A Model Manure Pit.

The manure pit shown in the illustration is 30 feet long by 12 feet wide in plan and 9 feet deep from the floor to the top of the wall. It is constructed with a concrete foundation and a wooden superstructure with an asbestos shingle roof. The concrete walls extend to a height of 5 feet 6 inches above the floor and are 9 inches thick. The floor is constructed of 3 inches of concrete laid in blocks 7 feet 6 inches by 6 inches.

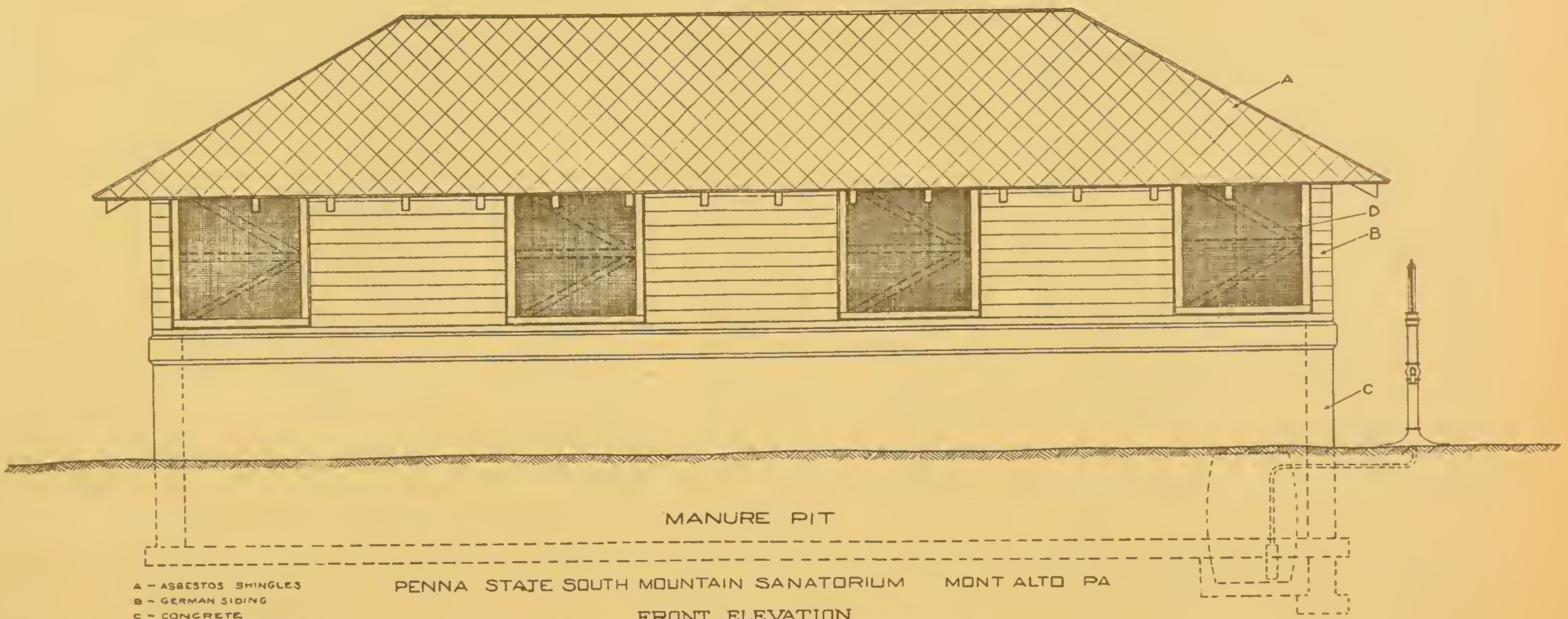
A 2 by 6 wooden sill is laid on top of the concrete wall and is held to it by bolts imbedded in the concrete and spaced 3 feet centre to centre. On this sill rests the frame work of the building which is constructed of 2 by 6s and sheeted on the exterior with German siding.

The roof is supported by 2 by 6 rafters and is composed of 1-inch sheathing covered with asbestos shingles laid in the diamond pattern.

The illustration shows the front elevation of this manure pit which is on the lower side opposite to the barn. The ground on this side as shown in the illustration is graded to an elevation 3 feet above the foundation of the walls. On the opposite side of the building next to the barn the grade is carried to the top of the concrete work. There are four doors located on each side of this structure and one in each end. These doors are approximately 4 feet square and consist of a light wooden frame work covered with copper bronze screening of No. 14 gauge.

The manure is hauled from the barn to the doors on the upper side and dumped or forked into the pit. When it is necessary to empty the pit it is thrown through the doors on the lower side shown on the illustration into the wagons which can drive along this side of the building.

In one corner of the building, as shown in the illustration, there is located a shallow sump to which the concrete floor slopes from all directions. A perforated barrel is placed in this sump to permit of the liquids from the manure collecting at this point. A small hand force pump is located to one side of the building on the ground immediately outside and the suction end of this pump is carried through the barrel to the bottom of the sump. The pump is so arranged that a hose connection can be made with the discharge end so as to lead to a tank placed on a wagon, making it a simple matter to draw off the liquids from this sump, that it may be economically used as a fertilizer.



A – ASBESTOS SHINGLES
B – GERMAN SIDING
C – CONCRETE
D – COPPER BRONZE SCREEN

PENNA STAJE SOUTH MOUNTAIN SANATORIUM MONT ALTO PA

FRONT ELEVATION

Pennsylvania
Health Bulletin

No. 24. HARRISBURG, PA. JUNE, 1911.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

EFFECTS OF TUBERCLE PRODUCTS ON EPITHELIUM.

EXPERIMENTS DIRECTED TO DEMONSTRATE A RELATIONSHIP BETWEEN CANCER AND TUBERCULOSIS.

DEPARTMENT OF HEALTH LABORATORIES.

Published simultaneously in the Journal of the American Medical Association.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 24. HARRISBURG, PA. JUNE, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

EFFECT OF TUBERCLE PRODUCTS ON EPITHELIUM.

Experiments directed to demonstrate a relationship between Cancer and Tuberculosis.

That tubercle bacilli or their products have a stimulating effect upon epithelial structures we have convinced ourselves. This was quite clearly shown in our work during 1909 and the experiments early in 1910 abundantly corroborated it. However, we could only be sure of the effects upon the epithelium in bile ducts and bronchi, while in Mamma and skin epithelium the appearances were far from regular. The work has therefore turned toward establishing conditions which could produce definite continuing results. The results in regard to the organs used are to be found in the following paragraph.

1. *Rabbit Ear.* For the purpose of stimulating the growth of epithelium on the ear, two methods were used, one of injecting the material as closely beneath the epidermis as possible, another by rubbing wax derived from tubercle bacilli into the abraded surface on the ear skin. The result seen under the microscope will be found in the succeeding paragraphs.

Ear of Rabbit No. 57. 13 injections .2 mg. dead tubercle bacillus under the skin of ear. Epithelium is essentially the same in the two ears where there are no hair follicles; where hair follicles are present, the epithelium seems a little thicker, but there is no evidence of active multiplication. Very few mitoses can be found; the connective tissue immediately below the epithelium is slightly more cellular in the treated than the untreated ear.

Ear of Rabbit No. 61. 14 injections .5 mg. tubercle bacillus wax under skin of ear. Treated ear; there are many irregularities in the surface epithelium, both in the thickness and in its penetration; there does not seem to be any increase in hair follicle epithelium; connective tissue is rich, well organized acellular with the exception of one or two minor round cell collections in vicinity of blood vessels.

Rabbit No. 62. Crude wax molten by gentle heat and rubbed 27 times in six months on an abraded surface on the ear. The other ear was abraded in a similar manner by the same instrument but no wax was applied. After removing a piece of the skin of each ear, the microscopic examination revealed nothing abnormal about the abraded untreated ear skin. The only noteworthy change in the treated ear skin in the great number of glands and hair follicles throwing off dry epidermal plates, and the collecting of crust of dried plates on the surface are certainly thicker than in the control animal.

2. *Guinea Pig's Mamma. Rabbit's Mamma.* We had two of our original rabbits left and made use of them for the reason that they had already received irritating dosage in the mammary gland and we felt that they would be much more likely to show epithelial alterations than new animals. We accordingly took them from the males, treated them for a short time and put them with the males again, and for the third time treated them with injections. Notwithstanding this severe treatment true stimulation of epithelium to adenomatous or carcinomatous growth did not result. Here are the notes made from the microscopic sections of one. The other simulated closely.

Rabbit No. 58. Injected six times dead degreased tubercle bacilli; put with male; injected five times; put with male injected nine times. Did not conceive; mamma dissected off. The injected gland shows less activity than the untreated. A larger part of section surface of untreated gland shows active milk production. The lining of the duct and skin surface shows greater tendency to drying and flattening in the treated glands. The epithelium is the same in both.

Guinea pigs were treated with dead degreased tubercle bacilli, dead tubercle bacilli and living tubercle bacillus extract. Two guinea pigs whose young had died were also treated with wax emulsion. The wax formed a ball mass in the gland and was encapsulated, thus having no effect upon the epithelium.

The treatment given the animal injected with the first named substances consisted of injection, then mating, and again injections. One (631) conceived and the mammary gland was removed as soon as the young could be separated from the mother.

No. 631. Treated with dead tubercle bacilli three times, then mated, injected three times. Treated mamma presented low grade but definite interstitial mammitis with distortions of acini and some attempts at reduplication of epithelial lining similar to that in adenoma; untreated mamma normal.

No. 536. Injected three times dead tubercle bacilli, then mated, then twelve injections. Animal has an abscess in mamma between last two injections which were three weeks apart. Died from enteritis. Very little difference microscopically between the two glands. In the treated one the connective tissue is probably greater in amount than in the untreated; the gland lumina are wider and much secretion fills them up. No epithelium cell change.

No. 637. Injected three times tubercle bacillus extract, mated, injected seven times. Died from enteritis. The only noteworthy difference between treated and healthy glands lies in the abundance of desquamated epithelial cells in the gland lumina of the former.

3 and 4. *Bronchioles and Hepatic Bile Ducts.* The two structures may be considered together because they are influenced seemingly in the same manner. In last year's report we described how the bile ducts became prominent, tortuous and apparently increased. We are now convinced that the actual increase in bile ducts occurs and we believe that they arise from liver columns.

We have one section in which a bile duct can be traced from liver column cells with their homogeneous pale purple straining protoplasm and uniformly blue nearly solid nucleus, into a well formed seemingly old bile duct with epithelium having deep blue vesicular nucleus and rarified pale blue protoplasm.

The exact point at which this newly made duct assumes its basal membrane cannot be precisely determined but it occurs before the transition of the cell staining properties is complete. As discussed in a previous paragraph connective tissue increase is quite pronounced in these livers and this new growth is most marked in the fields containing the newly formed bile ducts. The connective tissue does not penetrate the lobules farther than where the changes of liver columns indicate alterations of cells preceding the form of duct epithelium. The bile ducts are very tortuous, and indeed so conspicuously ramified and distorted that the picture of cystic adenoma is closely simulated. There may be also papillary outgrowths in laterial sections but one cannot say yet that these are more than ramifications cut across.

In the bronchioles the changes are fundamentally the same. The epithelium lining shows, however, much more change correspondingly than do the bronchioles as tubes. One cannot say that they are increased in number, but they are undoubtedly abnormally tortuous. The epithelium is reduplicated both regularly and irregularly. The glands of the larger bronchioles show changes suggestive of carcinoma simplex although by search one can find a well formed complete basal membrane.

Within the bronchiolar lumen, one may see papillomatous overgrowth of the epithelium, usually but not always accompanied by connective tissue stalks. Many desquamated whole and disorganized epithelial cells lie in lumen. Similar pictures, but to a very mild degree, are seen in large bronchi.

Discussion. The results of our experiments with the purpose of stimulating superficial epithelium overgrowth by products of the tubercle bacillus have not been satisfactory. At most there is but little overgrowth and that is best seen on the free surface where the irritant was applied locally. Here the tubercle bacillus products have behaved as most other mild irritants, producing a low grade keratosis. On the other hand in the internal viscera of animals injected subcutaneously or intraperitoneally with the tubercle product a very decided influence is exerted upon bile ducts and bronchiolar epithelium, which can be explained only on the basis of some attraction relationship between epithelium and the tubercle bacillus. However, the following conditions must be strongly emphasized. Animals receiving tubercle bacillus products into the peritoneum or beneath the skin show these changes clearly enough to be followed. Animals given living tubercle bacilli either after or before the product show the changes in liver and lung very well and in much farther advanced condition than when living tubercle bacilli are not given. Animals receiving only living tubercle bacilli controls, present changes to about the same degree as seen in animals receiving only injections of products. The deduction is therefore justifiable that a combination of living tubercle bacilli and a tuberculin is necessary to the great effect upon epithelium. This is not true for endothelium which seems to rapidly undergo the changes usual in unrestrained tuberculomata or in caseous tuberculosis.

We might hazard a conclusion that this helps explain the benefit of tuberculin injections upon tuberculosis of organs rich in epithelium and the rather less promising outlook for caseous lesions where endothelium predominates.

SAMUEL G. DIXON,
ALLEN J. SMITH,
HERBERT FOX,
Laboratories of the Commonwealth of Pennsylvania.

Pennsylvania
Health Bulletin

No. 25. HARRISBURG, PA. JULY, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

Five Years of
Tuberculosis in Pennsylvania.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 25. HARRISBURG, PA. JULY, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

FIVE YEARS OF TUBERCULOSIS IN PENNSYLVANIA.

So long as tuberculosis continues to occupy its prominent position as a cause of death, all statistics in any way relating to its incidence and geographical distribution must be of more than ordinary interest.

The year 1910 marks the end of the first five-year period of reliable vital statistics in Pennsylvania. While this comparatively short time does not permit of a very extensive review, it does afford an opportunity to consider with accuracy the present status of tuberculosis as a mortality factor. It likewise enables us to measure in a degree the general trend of the disease and perhaps more fully to appreciate the nature and extent of the efforts which must be directed to its control and ultimate extermination.

In the statistics published from year to year since 1905 the death rates were of necessity based upon the estimates of population supplied by the Federal Census Office, which estimates were computed from the Census returns of 1900. The recent census of 1910, the results of which are now available, gives an exact enumeration of the population for that year and enables us to revise accurately the estimated figures employed in the previous five years. This has been done and the death rates specified herein have been corrected accordingly.

The present statistical review will consider only tuberculosis of the lungs, and for accurate purposes of comparison death rates per 100,000 of population will be employed in preference to total deaths.

The term "urban" is applied to population and deaths included in all cities and boroughs having more than 10,000 inhabitants; and the term "rural" to all municipalities not embraced in the above group and including all country districts.

The State population for the year 1910 was 7,665,111, and of this number, based upon the sub-division mentioned, 3,653,371 or 47.8 per cent. was urban and 4,011,730 or 52.2 per cent. was rural.

The tables presented show the mortality rates for the entire State, for urban and rural districts, for certain individual municipalities and each county for the years 1906 to 1910 inclusive, with comparison of 1910 rates with the previous year and with the five-year averages.

In this connection it may be well to utter a word of caution as to the use or rather the interpretation of mortality statistics as given and particularly of such statistics as they relate to tuberculosis. While they do afford the only authentic basis for any definite conclusion, they need to be analyzed intelligently and with due regard to their complex factors, if we would avoid errors of deduction in our own minds or what is even more deplorable, the creation of false impressions in the minds of others. It must first be borne in mind that as an essential feature of accurate registration of vital statistics, deaths are registered in the locality in which they occur and not necessarily in the locality in which the disease was contracted.

In acute as well as in many general affections these localities are often identical, but in no other disease is the place of death as frequently so remote from the point of infection as in tuberculosis. It is obviously impossible, therefore, to demonstrate the increase or decrease of this particular disease by the mortality statistics of any isolated locality, and no intelligent estimate of such changes or of the value and success of preventive measures can be made which does not take into consideration with other factors a geographical area much greater than is embraced within the limits of the mortality returns of a single municipality or even of a group of municipalities.

Neither should we in attempting to measure the effectiveness of preventive work in individual municipalities use without qualification the rates of decrease measured in units of 100,000 population for the purposes of accounting for any decrease in the State as a whole. A decrease of 4.0 per 100,000 of population in the State is comparable to a decrease of 19.8 per 100,000 of population in Philadelphia, our largest municipality. In other words, it would require a decrease in the Philadelphia rate five times any decrease in the State rate before the latter could be fully accounted for by a decline in that city alone.

The statistics presented show several interesting facts:

First.—For the entire State a rate for the year 1910,—2.3 in excess of the rate for 1909, but a rate for the year 1910,—4.1 less than the average rate for the preceding five years.

Second.—An urban rate for 1910,—0.1 less than for 1909 and 10.0 less than the preceding five-year average.

Third.—A rural rate for 1910,—2.0 greater than for 1909 and 4.9 less than the preceding five-year average.

The yearly death rate for the entire State which had shown an annual decrease for the years 1906 to 1909 inclusive, was as follows:

1906, rate,	129.6
1907, rate.	128.0
1908, rate,	117.3
1909, rate,	115.1
1910, rate,	117.4
Five-year average rate,	121.5

It is evident that while the rates show a declining tendency, there are "lean" years and "fat" years in tuberculosis mortality. This fact is further emphasized by the statistics of the Federal Census Office covering the States included in the registration area, an area embracing approximately fifty per cent. of the population of the United States. The rates for the group of States, cities and rural, in the years mentioned above, are as follows:

	1906.	1907.	1908.	1909.	1910.	Five-year Average.
Registration states,	151.5	150.2	138.2	133.2	134.2	141.5
Cities in registration states,	179.8	176.0	162.1	154.6	155.5	165.6
Rural part of registration states,	118.5	119.8	111.8	109.9	110.5	115.7

If we extend our observation somewhat farther to the statistics of those States with accurate mortality registration, we find the same conditions have existed at various times in quite a general degree and to such an extent as to influence the rates for the entire group of registration States.

In the past decade, 1900 to 1909 inclusive, the death rates for the registration States declined from 173.3 to 133.2, but the rate for the year 1903 was 1.5 higher than for 1902 and the rate for 1904 was 10.4 higher than for 1903.

In considering some of the individual States, we find that in Connecticut the ten-year decline was from 173.1 to 130.7, but the rate for 1905 was 3.0 higher than for 1904, and for 1907, 12.3 higher than for 1906.

In Indiana the ten-year decline was from 173.2 to 138.6, but for 1905 the rate was 19.3 higher than for 1904.

In Maine the ten-year decline was from 157.4 to 114.3, but for 1904 it was 17.9 higher than for 1903; for 1906, 6.9 higher than for 1905, and for 1907, 2.2 higher than for 1906.

In Massachusetts the ten-year decline was from 188.0 to 134.0, but the rates for 1904 and 1905 were 15.3 and 4.8 higher than for 1903.

In New Jersey the ten-year decline was from 184.0 to 148.5, but the rates for the years 1903, 1904, 1905, 1906 and 1907, were all higher than for the year 1902.

In New York the ten-year decline was from 191.1 to 156.4, but the years 1903, 1904, 1905, 1906 and 1907 were higher than the rate for 1902.

An increased yearly rate as compared with the previous year is, therefore, no indication as to the actual tendency of tuberculosis to increase, but rather represents a "harvest" period in which those afflicted succumb more readily from climatic and various other causes. Newsholme interestingly suggests recurring limited periods of financial depression and individual poverty as exerting strong influences in producing temporary high death rates from this disease. It is more than probable that the complex causes which produce an increased death rate from tuberculosis at certain yearly periods are general in their force and effectiveness against all those who are in any manner physically impaired, as we find in the years mentioned above not only an increased tuberculosis death rate, but also an increased general death rate and an increased rate particularly from the respiratory and degenerative diseases.

The fallacy of attempting to measure the increase or decline of tuberculosis from the individual yearly death rates of isolated municipalities is illustrated in the widely varying rates of the many cities throughout the Commonwealth.

Allentown had a rate of 103.4 in 1908, but a five-year average rate of 118.9; Beaver Falls a rate of 88.0 in 1906, 181.3 in 1907 and a five-year average rate of 120.5; Braddock a rate of 152.9 in 1907, of 83.9 in 1909 and a five-year average rate of 110.1.

Some of the notable fluctuations in five years are as follows:

Carlisle,	Between	99.6	and	207.7
Chambersburg,	Between	93.9	and	157.7
Columbia,	Between	59.2	and	122.4
Dunmore,	Between	35.9	and	102.0
Duquesne,	Between	57.8	and	113.4
Easton,	Between	88.8	and	143.4
Erie,	Between	87.1	and	116.6
Harrisburg,	Between	95.1	and	125.7
Hazleton,	Between	29.6	and	98.0
Homestead,	Between	115.1	and	153.5
Johnstown,	Between	99.8	and	121.8
McKeesport,	Between	92.6	and	155.2
Nanticoke,	Between	17.7	and	55.3
Oil City,	Between	46.0	and	84.1
Phoenixville,	Between	65.9	and	167.5

Pittston,	Between 38.5 and 87.6
Plymouth,	Between 17.9 and 87.2
Pottstown,	Between 71.2 and 154.7
Pottsville,	Between 82.4 and 121.3
Shenandoah,	Between 56.5 and 100.4
South Bethlehem,	Between 74.8 and 132.8
Steelton,	Between 91.0 and 175.7
Sunbury,	Between 39.8 and 114.3
Warren,	Between 39.9 and 101.3
West Chester,	Between 118.5 and 193.7
Wilkinsburg,	Between 48.8 and 136.9
York,	Between 116.3 and 160.1

In the municipalities of Philadelphia and Pittsburgh, which from a population standpoint are in a class by themselves, the rates do not show any such wide fluctuations, the ten-year rates for these cities being as follows:

	Philadelphia.	Pittsburgh.
1901,	210.9	129.2
1902,	198.4	131.0
1903,	216.2	136.9
1904,	230.4	149.5
1905,	203.4	149.1
1906,	225.1	126.2
1907,	220.8	112.4
1908,	201.7	114.2
1909,	189.0	109.0
1910,	193.5	104.2
Ten-year average rate,	208.9	126.2

In the two cities above mentioned there are several instances in which yearly rates are in excess of the previous years.

The highest rate for any municipality in the State is presented by the borough of Norristown. This rate is augmented, however, by the deaths which occur from tuberculosis of the lungs in the State Hospital for the Insane and which are registered within the municipal limits. Excluding the deaths in this institution, the corrected death rate for Norristown is 100.4.

In considering the distribution of rural tuberculosis, several counties presenting death rates considerably higher than the average are entitled to correction, for the reason that the rates are largely influenced either by deaths in institutions for the treatment of tuberculosis or institutions in which there are high death rates from this disease. In the Allegheny county rate there are included deaths in the Pittsburgh City Farm.

In Dauphin county, deaths from the State Insane Asylumn are included.

In Franklin county, deaths from the State Sanatorium for Tuberculosis are included.

In Montour county, the deaths from the State Insane Asylum are included.

In Bucks county, the deaths from a State Insane Asylum are included.

The rates in Carbon and Lehigh counties are increased by deaths in sanatoria for the treatment of tuberculosis.

In Warren and Venango counties, deaths from State institutions for the insane and feeble-minded are included.

One very striking fact, however, presents itself in considering rural tuberculosis, viz:—that there is a widespread distribution of the disease throughout the sixty-six counties of the State, covering over 45,000 square miles of territory, to a degree that is rather startling.

We find counties sparsely settled with less than fifty inhabitants per square mile with death rates from tuberculosis varying from 70 to 100, and we may well ask whence comes this tuberculosis in our farms and villages. And the answer is that over 60 per cent. comes from our cities. It is impossible to show over a period of twenty or thirty years just what influence the migration of tuberculosis sufferers from urban to rural life has had upon the mortality rates of these localities during such period, but through the statistics of the last five years we are enabled to trace backwards rural deaths from this cause to their point of inception and this path leads us in 60 per cent. of such cases to our larger municipalities.

We know that in the insanitary, social and industrial conditions of our large cities, tuberculosis breeds and thrives and that the fatal termination of the disease, after dragging its prolonged course through a period of years, is frequently to be found in some isolated hamlet, to which in a last vain hope for health and life, the sufferer has fled too late. It is the powerful agencies of fresh air, sunlight, rest and nouishing foods—the strongest weapons in fighting the disease—that inevitably lead the sufferer away from urban to rural life. It is there that the final scenes are laid and it is there that the death is recorded. Though created and fostered by the city, it is ultimately charged to the country, and too much credit, based upon a declining mortality rate, is frequently demanded by the former. Municipalities are loath to have charged back to them the deaths of former residents from tuberculosis, even when it is known beyond a doubt that the disease was therein contracted; and yet if we attempt to measure the effectiveness of preventive measures and in so doing rely upon mortality statistics as the medium of measure, such deaths should undoubtedly be so charged.

Rural death rates have not declined so rapidly as urban rates. This is true not only of Pennsylvania but of other States as well. From 1906 to 1910 inclusive, the urban rate in the registration States declined 24.3 and the rural rate declined 8.0. For the ten-year period 1900 to 1909 inclusive, the urban rate for the same group of States declined 49.5 and the rural rate declined but 27.1.

With all natural factors favorable, rural tuberculosis death rates declined about one-half as rapidly as urban rates, because the rural death rates represent a constantly and steadily increasing increment of urban tuberculosis.

Obviously, a truer measure of the decline or increase of tuberculosis in given localities is to be found in the registration of every living case. The intelligent application of preventive measures rests in a large degree on this feature, and it was the realization of this fact that prompted the Department of Health to class tuberculosis as a reportable disease in 1905.

The total number of such cases reported (14,714), during the year 1910 shows, however, how meagerly the morbidity statistics represent the true status of the disease and how much we must depend upon mortality data. Whatever stigma such a paucity of the registration of living cases implies must remain with the physicians and others who are responsible for the reports and who resent compulsory legal processes directed against their neglect.

The influence of the large municipalities upon the rural death rates is shown strikingly by examining the rates for those counties in close proximity to such cities. The counties of Bucks, Chester, Montgomery and Delaware, in close proximity to the city of Philadelphia, all show rates far in excess of the average rural State rate; in fact, the rates in these counties closely approximate the five-year average rate for all urban districts, the comparison being as follows:

All urban districts, average rate for five years,	150.0
Bucks county, average rate for five years,	127.5
Chester county, average rate for five years,	123.5
Delaware county, average rate for five years,	150.6
Montgomery county, average rate for five years,	124.5

In like manner, the five-year average rural rate for Allegheny county surrounding the city of Pittsurgh was 147.3. As concrete illustrations, it may be mentioned that the city of Pittsburgh had during 1910 over 100 deaths from tuberculosis of the lungs which occurred in institutions in Allegheny county outside of the municipal limits; and during the same period the city of Philadelphia had over double that number in similar institutions.

But aside from the deaths that occur in institutions there is still another phase to this migration of the tuberculous sufferer which has about it all the pathos of tragedy and which of necessity calls for the exercise of statewide preventive measures. The country home has innocently welcomed the wasted sufferer and through the thoughtlessness of ignorance or indifference the disease has remained an unbidden guest, continuing through the years to exact its heavy toll from those exposed to the infection. Thus house infection and direct personal contact have been the great mediums of perpetuating rural tuberculosis.

When we look over the distribution of tuberculosis as it exists today—even to the remotest sections of our State—and realize that 95 per cent. of all deaths from this disease represents a focus of infection which must be eliminated and that the deaths represent possibly but one-tenth of the living cases equally wide in their distribution, we can but conclude that the management of tuberculosis, the greatest possible menace to modern life, has already been left too long in the hands of volunteer and philanthropic organizations, which lack authority and whose fields of activity have been narrowly localized. While we must not minimize or underestimate the work that has been done by such agencies in the dissemination of knowledge and in the education of the public mind, nor undervalue their extension of relief to the poor and needy, we must recognize their limitations in dealing with a problem that calls for the exercise of police and sanitary powers such as are only vested in constituted authorities.

It has of necessity become an imperative governmental duty in which preventive measures must be co-ordinated, comprehensive and rational, and their application must be constant and exhaustive rather than intermittent and capricious. The lavish hand of private charity should not mask the duties of public necessities. It is just as easy and far more dangerous to pauperize a community or a State as it is an individual. There is ample room in a work of such great magnitude for all the agencies of our modern civilization. These agencies are needed, and when cities and States have exhausted their powers and their facilities, there is still ample room for social, educational and relief work, by any philanthropy and charity that is broad enough to recognize and grasp such opportunities.

Mortality rates per 100,000 population for the entire State, for cities over 10,000 population, for rural sections, and for certain individual cities for the years 1906 to 1910 inclusive, with comparisons of the 1910 rates with the previous year and also with the five-year averages.

	1906.	1907.	1908.	1909.	1910.	Five year average.	Comparison of 1910 with previous year.	Comparison of 1910 with 5-yr. average.
Entire State,	129.6	128.0	117.3	115.1	117.4	121.5	+ 2.3	— 4.1
Urban,	165.5	159.0	145.6	140.1	140.0	150.0	— 0.1	—10.0
Allentown,	113.1	131.2	103.4	122.1	124.5	118.9	+ 2.4	+ 5.6
Altoona,	78.4	60.7	77.4	64.2	63.1	68.8	— 1.1	— 5.7
Beaver Falls,	88.0	181.3	118.6	116.5	98.1	120.5	— 18.4	—22.4
Braddock,	145.0	152.9	112.4	83.9	56.6	110.1	— 27.3	—54.5
Bradford,	88.2	61.3	54.7	75.4	61.9	68.3	— 13.5	— 6.4
Butler,	88.6	94.8	116.2	85.3	62.1	89.4	— 23.2	—27.3
Carbondale,	70.1	105.9	79.3	77.6	64.3	79.4	— 13.3	—15.1
Carlisle,	96.6	207.7	167.0	146.4	106.6	145.5	— 39.8	—38.9
Chambersburg,	157.7	93.9	77.2	127.8	135.4	118.4	+ 7.6	+17.0
Chester,	187.6	147.7	169.7	159.8	168.2	166.6	+ 8.4	+ 1.6
Columbia,	59.2	76.8	86.0	69.4	122.4	82.8	+ 53.0	+39.6
DuBois,	52.7	59.8	49.9	64.7	47.3	54.9	— 17.4	— 7.6
Dunmore,	102.0	86.5	35.9	93.0	62.1	77.9	— 30.9	—15.8
Duquesne,	106.4	57.8	68.9	72.4	113.4	83.8	+ 41.0	+29.6
Easton,	143.4	112.6	129.3	88.8	129.4	120.7	+ 40.6	+ 8.7
Erie,	112.7	116.6	100.0	87.1	125.7	108.4	+ 38.6	+17.3
Harrisburg,	99.1	108.9	95.1	119.3	125.7	109.6	+ 6.4	+16.1
Hazleton,	36.9	78.4	29.6	87.3	98.0	66.0	+ 10.7	+32.0
Homestead,	135.4	153.5	152.9	115.1	127.4	136.9	+ 12.3	— 9.5
Johnstown,	116.2	121.8	99.8	113.0	109.2	112.0	— 3.8	— 2.8
Lancaster,	173.3	111.9	132.1	109.1	101.4	125.6	— 7.7	—24.2
Lebanon,	75.2	63.9	89.7	109.9	88.2	85.4	— 21.7	+ 2.8
McKeesport,	153.2	155.2	101.6	92.6	109.7	122.5	+ 17.1	—12.8
Mahanoy City,	73.3	45.9	77.5	50.8	75.1	64.5	+ 24.3	+10.6
Meadville,	81.9	121.4	64.0	86.9	46.8	80.2	— 40.1	—33.4
Mt. Carmel,	69.4	49.1	83.6	46.6	51.1	59.9	+ 4.5	— 8.8
Nanticoke,	55.3	17.7	51.0	43.6	47.3	42.9	+ 3.7	+ 4.4
New Castle,	97.2	64.9	85.9	89.7	87.8	85.1	— 1.9	+ 2.7
Norristown,	252.7	213.0	223.4	233.4	225.1	229.5	— 8.3	— 4.4
Oil City,	81.4	60.1	46.0	84.1	44.6	63.2	— 39.5	—19.6
Philadelphia,	225.1	220.8	201.7	189.0	193.5	206.0	+ 4.5	—12.5
Phoenixville,	167.5	97.0	86.0	65.9	83.5	99.9	+ 17.6	—16.4
Pittsburgh,	126.2	112.4	114.2	109.0	104.2	113.2	— 4.8	— 9.0
Pittston,	87.6	72.3	38.5	75.1	55.1	65.7	— 20.0	—10.6
Plymouth,	50.9	87.2	79.3	17.9	41.0	55.3	+ 23.1	—14.3
Pottstown,	154.7	86.3	98.3	71.2	127.9	107.7	+ 56.7	+20.2
Pottsville,	86.5	121.3	82.4	105.7	93.5	97.9	— 12.2	— 4.4
Reading,	97.2	104.1	95.7	94.0	107.8	99.8	+ 13.8	+ 8.0
Scranton,	71.9	81.7	80.0	84.6	90.5	81.7	+ 5.9	+ 8.8
Shamokin,	105.0	104.2	67.2	118.1	51.0	89.1	— 67.1	—38.1
Sharon,	117.7	106.9	103.6	127.3	110.7	113.2	— 16.6	— 2.5
Shenandoah,	63.3	78.4	56.5	75.0	100.4	74.7	+ 25.4	+25.7
South Bethlehem,	74.8	132.8	90.7	108.1	84.5	98.2	— 23.6	—13.7
Steelton,	163.5	175.7	93.7	134.9	91.0	131.8	— 43.9	—40.8
Sunbury,	114.3	39.8	69.0	74.3	57.7	71.0	— 12.6	—13.3
Warren,	39.9	67.9	66.2	101.3	71.8	69.4	— 30.5	+ 2.4
West Chester,	137.6	170.7	193.7	198.5	118.5	163.8	— 80.0	—45.3
Wilkes-Barre,	70.3	79.7	59.1	89.6	71.2	73.9	— 18.4	— 2.7
Wilkinsburg,	136.9	83.4	72.9	48.8	105.0	89.4	+ 56.2	+15.6
Williamsport,	114.1	113.0	95.9	132.9	81.6	108.1	— 48.3	—23.5
York,	150.8	125.1	135.9	116.3	160.1	137.6	+ 43.8	+22.5

	1906.	1907.	1908.	1909.	1910.	Five year average.	Comparison of 1910 with previous year.	Comparison of 1910 with 5-yr. average.
Rural,	105.4	108.8	100.6	94.0	96.0	100.9	+ 2.0	— 4.9
Counties.								
Adams,	139.6	110.6	90.2	122.3	96.2	111.8	— 26.1	—15.6
Allegheny,	149.0	160.4	140.8	133.7	152.4	147.3	+ 18.7	+ 5.1
Armstrong,	87.1	83.4	93.7	81.0	85.0	86.0	+ 4.0	— 1.0
Beaver,	109.3	84.2	115.1	89.8	79.6	95.6	— 10.2	—16.0
Bedford,	115.1	115.2	74.4	82.2	72.0	91.8	— 10.2	—19.8
Berks,	127.6	97.3	107.0	93.5	77.9	100.6	— 15.6	—22.5
Blair,	87.8	96.8	97.9	79.2	63.1	84.9	— 16.1	—21.8
Bradford,	85.1	87.6	92.0	51.0	80.8	79.3	+ 29.8	+ 1.5
Bucks,	139.6	149.3	117.8	130.1	100.5	127.5	— 29.6	—27.0
Butler,	66.4	73.5	37.3	60.2	94.1	66.3	+ 33.9	+27.8
Cambria,	74.2	50.7	67.1	63.4	70.8	65.2	+ 13.4	+ 5.6
Cameron,	27.0	93.7	92.9	92.2	52.2	71.6	— 40.0	—19.4
Carbon,	102.7	105.0	89.6	97.7	98.1	98.6	+ 0.4	— 0.5
Centre,	74.0	73.9	80.8	76.1	66.8	74.3	— 9.3	— 7.5
Chester,	126.5	141.7	113.0	126.9	109.6	123.5	— 17.3	—13.9
Clarion,	72.8	83.4	69.0	74.1	73.6	74.6	— 0.5	— 1.0
Clearfield,	56.9	84.2	60.5	36.1	56.5	58.8	+ 20.4	— 2.3
Clinton,	104.4	100.4	106.0	89.3	98.1	99.6	+ 8.8	— 1.5
Columbia,	70.8	73.8	66.1	64.9	61.7	67.4	— 3.2	— 5.7
Crawford,	88.6	84.6	68.4	71.5	71.9	77.0	+ 0.4	— 5.1
Cumberland,	133.0	169.0	114.8	127.6	126.6	134.2	— 1.0	— 7.6
Dauphin,	135.5	118.1	126.8	170.7	179.7	146.2	+ 9.0	+33.5
Delaware,	148.1	176.8	147.4	152.8	127.9	150.6	— 24.9	—22.7
Elk,	80.6	51.4	56.6	50.5	55.7	58.9	+ 5.2	— 3.2
Erie,	108.9	45.8	78.5	63.6	89.7	77.3	+ 26.1	+12.4
Fayette,	83.1	93.2	84.0	76.1	75.2	82.3	— 0.9	— 7.1
Forest,	39.8	10.1	41.1	52.3	31.9	35.0	— 20.4	— 3.1
Franklin,	152.9	168.0	154.6	262.4	391.2	225.8	+128.8	+165.4
Fulton,	91.9	133.1	82.1	144.0	92.8	108.0	— 51.2	—16.0
Greene,	146.6	121.9	118.2	159.5	138.4	136.9	— 21.1	— 1.5
Huntingdon,	92.1	107.3	79.7	94.7	88.6	92.5	— 5.9	— 3.9
Indiana,	92.8	82.3	66.2	59.1	57.0	71.5	— 2.1	—14.5
Jefferson,	69.8	66.2	70.6	60.5	49.1	63.2	— 11.4	—14.1
Juniata,	103.8	163.3	144.7	72.9	86.7	114.3	+ 13.6	—27.6
Lackawanna,	70.8	75.2	61.4	71.3	86.6	73.1	+ 15.3	+13.5
Lancaster,	136.2	115.3	77.9	96.2	107.9	106.7	+ 11.7	+ 1.2
Lawrence,	59.1	86.2	70.2	93.1	62.0	74.1	— 31.1	—12.1
Lebanon,	82.6	91.9	103.6	102.5	99.0	95.9	— 3.5	+ 3.1
Lehigh,	109.2	122.6	103.1	95.4	132.5	112.5	+ 37.1	+20.0
Luzerne,	71.6	71.6	80.3	88.6	85.7	79.6	— 2.9	+ 6.1
Lycoming,	66.4	51.7	45.3	57.4	67.4	57.6	+ 10.0	+ 9.8
McKean,	72.5	70.2	94.5	74.5	72.2	76.8	— 2.3	— 4.6
Mercer,	74.6	101.9	70.5	65.4	89.4	80.4	+ 14.0	+ 9.0
Mifflin,	146.1	188.9	55.7	91.2	132.7	122.9	+ 41.5	+ 9.8
Monroe,	125.8	80.2	154.8	149.1	95.7	121.1	— 54.4	—25.4
Montgomery,	122.8	131.3	104.2	136.8	127.2	124.5	— 9.6	+ 2.7
Montour,	81.0	203.0	244.1	95.1	161.6	156.9	+ 66.5	+ 4.7
Northampton,	114.7	122.7	135.5	83.5	98.4	110.9	+ 14.9	—12.5
Northumberland,	81.6	95.7	80.2	68.7	74.1	80.1	+ 5.4	— 6.0
Perry,	100.2	141.5	65.2	90.5	70.6	93.6	— 19.9	—23.0
Pike,	204.4	145.6	85.7	173.0	62.4	134.2	—110.6	—71.8
Potter,	29.9	60.0	90.3	57.0	50.5	57.5	— 7.5	— 7.0
Schuylkill,	88.9	94.6	86.0	90.9	70.3	86.1	— 20.6	—15.8
Snyder,	111.8	88.5	77.0	83.1	77.4	87.6	— 5.7	—10.2
Somerset,	65.9	59.1	80.7	61.9	64.6	66.4	+ 2.7	— 1.8
Sullivan,	60.3	69.4	52.4	52.8	88.7	64.7	+ 35.9	+24.0
Susquehanna,	106.1	83.3	68.1	81.7	100.8	88.0	+ 19.1	+12.0
Tioga,	68.5	65.0	59.1	36.9	58.6	57.6	+ 21.7	+ 1.0
Union,	107.4	60.1	66.7	85.6	55.5	75.1	— 30.1	—19.6
Venango,	128.1	81.0	105.2	91.7	105.4	102.3	+ 13.7	+ 3.1
Warren,	146.7	161.6	152.4	150.0	168.7	155.9	+ 18.7	+12.8
Washington,	93.6	90.6	96.8	95.3	87.4	92.7	— 7.9	— 5.3
Wayne,	138.5	81.4	64.6	109.2	92.4	97.2	— 16.8	— 4.8
Westmoreland,	68.6	90.4	82.0	68.3	65.0	74.9	+ 3.3	— 9.9
Wyoming,	80.5	81.4	113.9	70.3	51.7	79.6	— 19.6	—27.9
York,	82.7	95.3	94.3	103.4	94.7	94.1	— 8.7	+ 0.6

P416h

Pennsylvania
Health Bulletin

No. 26. HARRISBURG, PA. AUGUST, 1911.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

Organization of the Pennsylvania State Department of Health.

In part as read before the 38th Annual Session of the
AMERICAN PUBLIC HEALTH ASSOCIATION
And Published in the A. P. H. A. Journal, Vol. 1, No. 4.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 26 HARRISBURG, PA. August, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

ORGANIZATION OF THE STATE DEPARTMENT OF HEALTH.

If you were to ask me to tell you the foundation upon which the entire structure of the State Department of Health of Pennsylvania is built, the pivot of the whole organization, the theme that runs through the work of every division, I should say it was GETTING CLOSE TO THE PEOPLE.

Clothed with ample power to enforce the broad comprehensive health laws enacted for our execution, we started with this assumption: "Our people want to be healthy if they only know how." It was our business therefore to teach them.

The public press of the state, nine hundred journals strong, responded splendidly to our call for aid. To every fireside in Pennsylvania they have carried the message of health and life. Civic clubs, labor organizations and the big employers of labor throughout the state were asked to work for the cause, and they have been constant and effective mediums through which we have reached the people. From every pulpit in Pennsylvania we have spoken through the pastor to his people and I cannot begin to tell you how much good has been accomplished through this channel. We believe in reaching the boys and girls who will soon be our men and women, and so our tuberculosis and general sanitary exhibit, as it travels through the state, makes a particular point of interesting and instructing the school children. The little people learn the lesson of health themselves and they help us wonderfully in reaching their parents, and thus by the time our organization was well under way, we found that the people were coming to us, for instance, to disinfect their homes after tuberculosis.

Do you not see now what I mean by getting close to the people? Can there be any other result other than a general uplift in the social and economic as well as the health conditions among those of our citizens who need help? We find that such people are beginning to look upon their government as their very friend and helper. They are learning that the State Department of Health is something more than a mere sanitary policeman; that it's sole aim is to go hand in hand with them as a guide through the darkness of ignorance and disease, out into the sunlight of right living.

Prior to the Act of June 3, 1885, the public health work in the Commonwealth of Pennsylvania was limited to measures of quarantine at the port of Philadelphia and to spasmodic measures of quarantine in the larger municipalities. The Act of 1885 provided for the appointment of a Board of Health consisting of six persons, the majority of whom were to be physicians of good standing, and a secretary who also was to be a medical man of not less than ten years professional experience.

Dr. Benjamin Lee, a member of the profession of whom we may all be proud, a gentleman who represents the highest type of medical man, was elected secretary. By virtue of his office he became the chief sanitary officer of the Commonwealth, retaining this position continuously for a term of twenty years. The Board of Health did a great deal of good in an educational way, but was so crippled in its work by lack of funds and was so circumscribed in its powers and duties that this twenty year period may now be looked upon as simply an era of splendid missionary work.

The first sanitary code of Pennsylvania, adopted June 18, 1895, required the reporting to health officers of but eleven diseases. This act had been in part enforced in the larger cities but remained almost a dead letter so far as country districts and small municipalities were concerned.

The year 1905 is a memorable one in the Commonwealth of Pennsylvania from a public health standpoint, because in this year the most comprehensive and effective legislation for the protection of the health of the public ever adopted in any state of the Union was enacted by the legislature and signed by the governor of the State. This legislation consisted of three acts, a brief resumè of each being necessary to a proper discussion of the present system of organization.

First: "An Act creating a Department of Health and defining its powers and duties."

Second: "An Act to preserve the purity of the waters of the state for the protection of the public health."

Third: "An Act to provide for the immediate registration of all births and deaths throughout the Commonwealth of Pennsylvania."

All three of these acts were passed by the legislature and approved by Governor Pennypacker during the month of April, 1905.

THE ACT CREATING THE DEPARTMENT OF HEALTH is typical of modern legislation and centralizes authority in the hands of the Commissioner. Provision is made for an Advisory Board, consisting of five physicians and a Civil Engineer, whom the Commissioner can call upon for the purpose of consultation and the adoption of rules and regulations. A companion act carried with it a liberal appropriation and afforded ample means for putting into force all reforms believed to be necessary to place health matters in Pennsylvania on a high plane.

THE ACT PROVIDING FOR THE PREVENTION OF THE POLLUTION OF PUBLIC WATERS delegates all authority for protecting the streams and other sources of supply to the Governor, the Attorney General and the Commissioner of Health, and completes the groundwork upon which the present organization is based.

VITAL STATISTICS. The registration of births and deaths had been shamefully neglected up to this time. The third act, referred to by title, places this registration system in the Department of Health.

The Commissioner is ex-officio a member of the Quarantine Board of the port of Philadelphia, the Water Commission, the Medical Council and the Dental Council.

In addition to the general grant of authority the Commissioner is "to determine the most practical means for the suppression and prevention of disease."

To summarize briefly, the acts specifically provide that the Commissioner shall determine what assistants are necessary to carry out the work imposed upon the Department and places the appointing power in him. It also enables the Commissioner to purchase all supplies and materials for carrying on the work of the Department; to issue subpoenas to secure the attendance of witnesses and compel them to testify; to issue warrants to any sheriff, constable or policeman to apprehend and arrest such persons as disobey quarantine orders or regulations of the Department—these warrants must be executed forthwith and a return of the execution must be made to the Commissioner; to either personally or by his agents without fee or hindrance, enter, examine and survey all grounds, schools, apartments, buildings and places suspected of containing nuisances or questions affecting the security of life and health and to confer the authority of constable on his agents for such purposes; to order nuisances to be abated and removed and to enforce quarantine regulations; to have the general supervision of the state registration of births, marriages, deaths and communicable diseases; of practitioners of medicine and surgery, and of midwives, nurses and undertakers. Any violation of the Department's orders issued by the Commissioner constitutes a misdemeanor and is punishable by fine or imprisonment or both.

Such are the powers conferred by these respective acts. Previous legislation provided for the organization of local Boards of Health in cities, boroughs and townships of the first-class. A few of the larger cities were already doing effective work. The smaller boroughs and towns were doing nothing except in times when smallpox became epidemic, when spasms of activity would be noted that were not always rational, only to die out with the end of the epidemic. All the vast rural and mountainous regions of the state were without Boards of Health, or systems of registration of any sort, and the only certificates of births and deaths in these communities were to be found on the church registers. Up to this time human beings were born, lived long lives and were buried with less likelihood of official record of their existance than was the case with high bred horses, cattle or dogs. Municipalities and private estates were permitted to discharge their sewage into the great streams of the Commonwealth without hindrance.

It is to the credit of the medical profession that the notable legislation upon which the present Department of Health in Pennsylvania bases its organization was planned by one of Pennsylvania's broad-minded, active medical men. Dr. Charles B. Penrose drew the acts, presented arguments in their favor to the various legislative committees, and deserves the credit for their adoption.

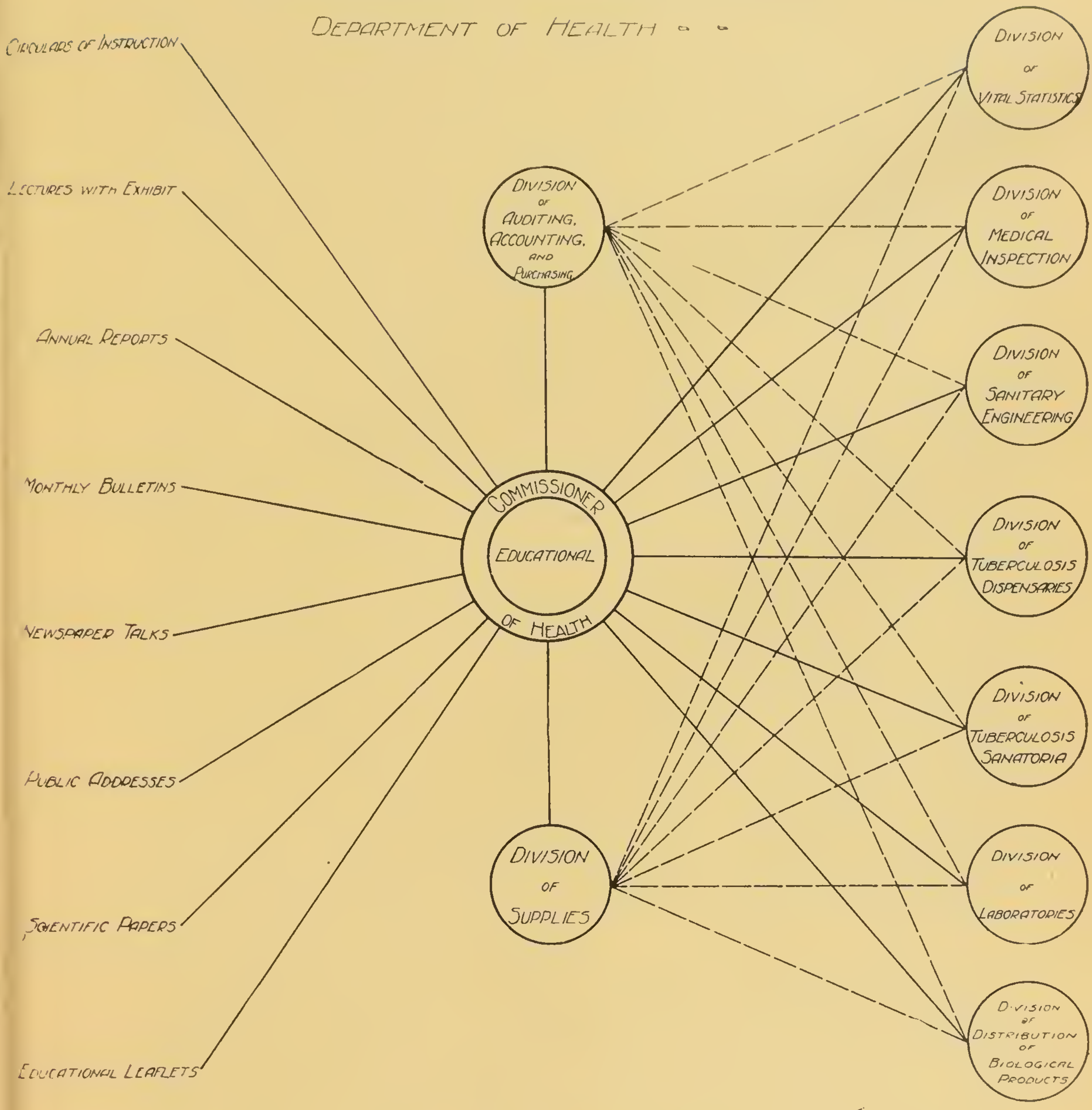
ORGANIZATION.

The present organization of the Department of Health has been worked out under the power and authority conferred upon the Commissioner by the three acts just referred to. The first essential work was the organization of a Bureau of Vital Statistics, as provided by one of the three acts of 1905. A division of Medical Inspection was organized almost simultaneously and these two departments were followed by the Division of Sanitary Engineering, the Division of Laboratories, the Division of Biological Products and the Division of Tuberculosis Sanatoria and Dispensaries. It very soon became evident that two additional divisions were required; one for purchasing, auditing and accounting, and another for the distribution of supplies required for the vast work. These various division rapidly grew to great size and usefulness, and today most of them have a number of important sub-divisions.

THE BUREAU OF VITAL STATISTICS has a registrar in charge, a full office staff and local registrars and deputies, one in each city, borough and large centre of population. These men receive all birth and death certificates in their respective communities, transmit them

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HEALTH


CIRCULARS OF INSTRUCTION
LECTURES WITH EXHIBIT
ANNUAL REPORTS
MONTHLY BULLETINS
NEWSPAPER TALKS
PUBLIC ADDRESSES
SCIENTIFIC PAPERS
EDUCATIONAL LEAFLETS
DIVISION OF AUDITING, ACCOUNTING, AND PURCHASING
COMMISSIONER OF HEALTH
EDUCATIONAL
DIVISION OF SUPPLIES
DIVISION OF VITAL STATISTICS
DIVISION OF MEDICAL INSPECTION
DIVISION OF SANITARY ENGINEERING
DIVISION OF TUBERCULOSIS DISPENSARIES
DIVISION OF TUBERCULOSIS SANATORIA
DIVISION OF LABORATORIES
DIVISION OF DISTRIBUTION OF BIOLOGICAL PRODUCTS

SCHEME OF ORGANIZATION

to the Registrar of the Department and issue all burial permits previous to interment, being compensated for their work by the respective counties. The Statistical Bureau seemed to be the natural place for developing a sub-division of Morbidity Statistics. A plan was evolved whereby upwards of 700 Health Officers should be appointed to represent the Department in the various districts in each county. Among their duties as the local representative is that of receiving morbidity reports and forwarding them to the Department of Health. Like provision has been made for the County Orphans' Courts clerks to transmit to the same Bureau copies of marriage certificates filed with them by those authorized to perform the marriage ceremony. The total number of persons making reports directly to this division at the present time consist of 1170 local registrars, 670 health officers, and 67 clerks of the Orphans' Courts.

THE DIVISION OF MEDICAL INSPECTION as organized, consists of a Chief Medical Inspector, an Associate Chief Medical Inspector, a General Inspector, a Special Inspector in charge of organizing Boards of Health, an office staff, a Medical Inspector in each County and a number of Health Officers (the same men who report morbidity statistics.) Their duties in the Medical Division consist of placarding houses on receipt of a morbidity report, establishing quarantine under the supervision of the County Medical Inspector, and disinfecting premises at the conclusion of communicable diseases.

The County Medical Inspector becomes practically the Department's consultant in his district and directs all quarantine measures through his Health Officers, is frequently called to see those sick with communicable disease, assists where necessary in establishing the diagnosis, enforces the Department's regulations for the sale of milk in premises infected with diphtheria, scarlet fever, typhoid fever, smallpox and epidemic meningitis, represents the Department in local outbreaks in communities having Boards of Health and supervises the sanitary conditions of his county in general.

The Department was soon able to extend the work in the Division of Medical Inspection to a campaign of sanitary education reaching dairy farms and public schools. Twice each year the Health Officers visit all premises throughout the Commonwealth which market milk and make a comprehensive sanitary report to the Department, the last inspection reaching 75,000 farms and stables producing milk. (Dairy inspection will soon be performed by the State Veterinarian.) Twice each year these same Health Officers visit public schools, some 13,000 in number, and make full reports of the sanitary condition of the school room, its grounds, outbuildings and water supply. Often special inspections are made by them of insanitary conditions, polluted rural water supplies, nuisances, etc., in their respective districts and abatements are ordered through them, this particular part of their work being by the Division of Sanitary Engineering.

Early in the organization the Medical Examiners for the great railways of Pennsylvania, 105 in number, were appointed deputy medical inspectors to the Department of Health to serve without salary, and were clothed with sufficient power to arrest on sight persons on railway trains or in railway stations believed to be carrying infection of communicable disease.

An additional corps of medical inspectors for public schools has been appointed and work already started.

A corps of volunteer physicians rendered valuable aid to the Department in the early days of its existance by reporting menaces to health, nuisances in various communities, and by calling attention to irregularities in work undertaken by Boards of Health of small towns.

The force in the Medical Division at the present time, in addition to the office staff, consists of 66 County Medical Inspectors, 105 Deputy Medical Inspectors (Railway Examiners), 670 Health Officers. and will include in a short time upward of 1,000 Medical Inspectors for schools.

THE DIVISION OF SANITARY ENGINEERING is one of great importance in the Department's work and is organized with seven sub-divisions, each with a staff of from eight to eighty persons, and all under the supervision of a Chief Sanitary Engineer.

The Act creating the Department places under the Commissioner's supervision all public water supplies and all public and private systems for sewage disposal. Details of every sewage disposal plant in the Commonwealth must be filed with the Department of Health and new construction can only be begun after the Commissioner, the Governor and the Attorney General have approved of the plan. After full investigations have been made by the Sanitary Engineering Division and the consent of the Governor and Attorney General has been secured, decrees are issued by the Commissioner permitting the installation of sewage disposal works or the extension of systems already constructed.

The Water Supply Commission arranges an equitable distribution of the public waters of the State and grants permission for its use. The details of all such water works must be submitted to the Commissioner of Health and his approval must be secured before construction can take place. This Division supervises the abatement of pollutions and the removal of nuisances.

One sub-division of the Sanitary Engineering Division is devoted to office work: a second, to that of map making; a third, to pettynuisances and complaints; a fourth, to sanitary field inspection; a fifth, to water works and sewage construction; a sixth, to the study of the purity of water supplies; and a seventh, to effluents from disposal plants.

The total number of professional men and especially trained inspectors in this division reaches 106.

TUBERCULOSIS.—In 1907, $1,000,000 was granted the Department for the purpose of organizing a campaign against tuberculosis. Two important divisions were organied for this work; a Sanatorium Division and one of Tuberculosis Dispensaries.

THE SANATORIUM DIVISION was permitted to take over a small camp already organized in the State Forestry Department at Mont Alto, in the southern part of the Commonwealth. This plant was immediately enlarged to several times its capacity and comprehensive plans were drawn for building a great sanatorium for incipient and moderately advanced cases with provision for hospital care for many far advanced cases.

THE DISPENSARY DIVISION at first consisted of a Chief of Dispensaries and a local representative—the County Medical Inspector—in 67 counties, each in charge of a dispensary. Later these dispensaries were increased to 115 in number and assistants were appointed in many of them. Nurses were soon found to be an essential adjunct to this work so that today including 115 Dispensary Chiefs, we have a total of 222 medical men connected with this division and 110 nurses. Two medical men assist the Chief of Dispensaries in a supervising capacity and two nurses are devoting their entire time to supervising the nursing end of the campaign. Each large center of population in the commonwealth is now provided with a Tuberculosis Dispensary where the indigent may secure free treatment, free advice, and the usual supplies required to prevent dissemination of the disease, and in case of great need, eggs and milk. This division at the present time includes a total of 348.

A gradual development of the Dispensary work has been along sociological lines. The dispensary physicians and nurses soon found that to accomplish results it was absolutely necessary in a considerable proportion of cases that patients and their families should receive assistance in various ways outside of that directly given by the dispensary. Through their efforts charitable societies and charitably disposed individuals have been interested and considerable sums of money and quantities of food, clothing, coal and other supplies have been contributed. In many cases local poor authorities have been induced to furnish aid. Frequently it was found that the occupation of the tuberculous patient was such as to endanger the health of the community and the dispensary nurses have proven of great value in procuring other employment. It is often found that a tuberculous patient is unable to leave home because there is no one to care for the children and in many cases the visiting nurse has found homes for the little ones, enabling their parents to take advantage of the sanatorium treatment offered them by the State. The number of people helped through these agencies has already run well up into the thousands.

Later appropriations for Tuberculosis—$2,000,000 in 1909, $2,653,-248 in 1911—enabled the Department to increase the size of Mont Alto Sanatorium. Today it accommodates nearly 800 patients and will, within a few weeks when buildings now under construction are completed, accommodate almost 1,000 patients. One additional sanatorium with large provision for advanced cases is under construction in the Allegheny mountains west of the centre of the State on the beautiful tract of land presented to the Commonwealth by Mr. Andrew Carnegie. Land has been purchased near Hamburg, southeast of the centre of the Commonwealth, and a third sanatorium similar in construction will soon be erected at this point.

LABORATORIES.—A well equipped laboratory is an essential part of every public health organization. Through the liberality of the University of Pennsylvania, opportunity was afforded to organize a Laboratory Division that should place at the disposal of the physicians of the Commonwealth skilled scientists whose services could be given to diagnostic work, and liberal provision was made for conducting research work. In this laboratory the Department not only undertakes to study blood, urine, sputum and cultures and complete chemical and bacteriological analyses of water supplies and effluents from sewage disposal works, but pathological tissues are carefully studied from the standpoint of morbid pathology as well as from that of the pathologic histologist, the diagnosis in each instance being forwarded to the family doctor.

Research work undertaken by this division is far reaching and permits officers to go into the field in times of epidemic for the purpose of studying unusual outbreaks of disease. It has allowed the development of a system of preparing tubercle bacilli products, after a plan worked out by the Commissioner, and such are now being successfully used in our dispensaries and sanatorium.

DIVISION OF DISTRIBUTION OF BIOLOGICAL PRODUCTS.—Another important division of the Department's work is that of the distribution of biological products. Through this division, diphtheria antitoxin was first distributed November 4, 1905, from only 478 distributing stations, but is now supplied free of cost to the poor from 656 distributing stations, each located at convenient points in every county in the State, except the cities of Philadelphia and Pittsburgh. Tetanus autotoxin is supplied through 67 distributors so situated as to be accessible from any locality in the State within 24 hours. Vaccine virus is distributed upon the recommendation of County Medical Inspectors, for the poor in second-class townships and in charitable institutions not receiving State aid which are unable to pay for it. Tubercle bacilli products, one an extract in sixteen dilutions and the other a suspension of dead bacilli also in sixteen different dilutions, are distributed to the 115 dispensaries and to the sanatorium.

THE ACCOUNTING, AUDITING AND PURCHASING DIVISION audits all accounts and purchases all supplies except for office work, the latter being purchased by the Department of Public Grounds and Buildings.

THE DIVISION OF SUPPLIES carries in stock everything required for the work of the various field officers and the working staff of the State Capitol and distributes material on receipt of requisitions properly countersigned. This Division is the equivalent of the shipping agency of a large department store.

EDUCATIONAL PUBLICITY.—It will be seen by this brief description of a plan of organization that the Chiefs of each of the various divisions receive their reports from the sub-heads and field officers, that they in turn utilize these reports and compile them for forwarding to the Commissioner. In the office of the Commissioner these reports are all re-edited for purposes of public instruction. Everything of educational value gathered in the most remote corners of the Commonwealth is diverted through the Division Chief to the Commissioner and is by him reflected back to the public through an important sub-division of his office staff devoting its time to editing department reports and promoting their publication. Indeed, this is one of the most valuable features of a public health campaign in any Commonwealth. Many avenues are open for such an educational campaign.

In addition to editing annual reports and summarizing all of the work done during the year, monthly bulletins are published and distributed to the physicians and health workers throughout the Commonwealth and adjoining Commonwealths, and weekly talks are given through the daily papers, educational stories being sent to all the great dailies; to some 900 small weekly newspapers throughout the country districts; a traveling tuberculosis and sanitary exhibit is maintained, giving public lectures in all large centres of population; papers are read before scientific societies, charitable organizations, Boards of Trade, Civic Clubs, Teachers' Institutes and various bodies interested in the welfare of the public; circulars of instructions are edited giving details of household isolation, quarantine and care of the sick, and the laity are constantly kept informed of all the work undertaken by the State Department of Health. In other words, these reports are rewritten and popularized by this important sub-division of the Commissioner's office staff.

You will gather from this meagre description that Pennsylvania's State Department of Health is a large organization and has many employes, a total of more than three thousand, shortly to be increased with the medical inspection of schools to 4,000 individuals. In remunerating those who do the work, every one connected with the central office of the department, receives either a yearly or monthly salary. The local registrars are paid fees for forwarding death and birth certificates by the respective counties. The County Medical Inspectors receive $1.25 per hour and all traveling expenses when at work. Health Officers are paid 40 cents per hour and traveling expenses. Tuberculosis Dispensary Chiefs receive $2.00 per hour, their assistants $1.25 and $1.00 per hour. Nurses in dispensaries are paid a monthly salary, those in the larger cities receiving more than those who work in country districts, and all are allowed their traveling expenses. The Sanatorium staff are paid stipulated salaries. Those who distribute diphtheria antitoxin and tetanus antitoxin receive no remuneration for their work.

The subject of this paper is The Organization of a State Department of Health. As Pennsylvania has been used as an example, may we not hurriedly glance at some of the results which this organization has accomplished.

From June 1, 1907, to June 30, 1911, 5,531 patients had been admitted to our State Sanatorium for Tuberculosis at Mont Alto. Many patients have been discharged with the disease arrested, hundreds have been benefited, and many more whose cases were too far advanced to hope for much aid have, however, been made comfortable and happy and have been provided with a home where they would not be a source of danger to others.

From July 22, 1907, to June 30, 1911, 41,792 poor tuberculosis sufferers had received the skilled medical aid and the attention of trained nurses which the Department's one hundred and fifteen dispensaries provide.

The death rate from pulmonary tuberculosis in Pennsylvania had fallen from 129.6 to 117.4 per one hundred thousand of population in four years. This means a saving of about 1,000 lives annually.

From October, 1905, when the State began its free distribution of diphtheria antitoxin among the poor, down to December, 1910, 27,318 cases of this dread disease, mostly little children, were treated for cure, with the life saving serum. We know by statistics that without antitoxin 42 out of every 100 of these children would probably have died but with the aid of the State's antitoxin, only 2,324 died and the death rate among these poor little sufferers was reduced to 8.50 per cent. Free antitoxin was also given for immunization purposes in 20,294 cases, mostly children who had been in contact with the disease. All but 335 of these were absolutely protected against diphtheria. The actual saving of child life resulting from the State's free distribution of diphtheria antitoxin since 1905 in cold figures is 9,152 lives—a pretty good investment of the tax payer's money.

Throughout Pennsylvania our streams are slowly, but surely, being freed from pollution. Not so slowly, either, when records show that up to August 1, 1911, 34,481 private sources of stream pollution have been abated upon notice from the Department, not to speak of the thousands more that have been stopped through the moral influence of this work. Eighty-nine modern sewage disposal plants have been either built or are in process of construction as approved by the State. Two hundred and eighty-four municipalities and private sewerage corporations are building comprehensive sewerage systems in accordance with plans for sewage treatment works, the details of which must be approved by the Department, for only on condition of their so doing have they been permitted to extend their sewerage systems. Already 86 modern water filtration plants have been approved by the State and are either built or being erected.

And what of typhoid fever in view of all this work for pure water? In 1906, 56.5 out of every 100,000 people died from this disease; in 1907, 50.3; in 1908, 34.4; in 1910, 24.5. That is, there are now living more than 2,400 people, who, had the death rate of 1906 prevailed in 1910, would have died from typhoid.

In 1906, the death rate in Pennsylvania per 1,000 of population was 16.5; in 1908, it had dropped to 15.7; and in 1910, to 15.6. At first glance this may not seem a remarkable diminution, but in a State with a population of 7,655,000, even a fractional decrease is a substantial gain. This appears when one figures precisely what this slight numerical drop means in the actual saving of human lives. Had the death rate of 1906 prevailed in 1908, 5914 more people would have died than actually succumbed. Had this same rate applied in 1910, instead of the decreased percentage recorded by the Department of Health, just 6,898 men, women and children now living and presumably in good health and spirits, would have died. In other words, these matter of fact statistics, when interpreted in their real relation to the welfare and happiness of the State, mean the saving to Pennsylvania of 20,000 lives in three years.

And we are going to fight on.

Pennsylvania Health Bulletin

No. 27. HARRISBURG, PA. SEPT., 1911.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

TUBERCULOSIS, IN THE COUNTRY AS WELL AS IN THE CITY, A DISEASE OF BAD HOUSING AND LACK OF NOURISHING FOOD.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 27. HARRISBURG, PA. Sept, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

TUBERCULOSIS, IN THE COUNTRY AS WELL AS IN THE CITY, A DISEASE OF BAD HOUSING AND LACK OF NOURISHING FOOD.

That statistics should show that Germany, the home of the discoverer of the tubercle bacillus, and recognized as one of the pioneers in the effort for the control of tuberculosis, is, notwithstanding, the nation which presents by far the highest mortality from that disease of any European country is a matter of surprise to sanitarians generally and naturally of great concern to her own sanitary authorities.

Our own Department medical inspectors in Pennsylvania often feel disheartened when they consider the problem which confronts them in view of the continued prevalence of tuberculosis in our rural districts, villages and small boroughs and the excessively insanitary conditions which prevail therein. But the corresponding conditions in the Kingdom of Prussia are even more lamentable and discouraging. An investigation made during the past year by Dr. P. Jacob,* Professor at the University of Berlin, undertaken in order to discover some cause for the persistent prevalence and stationary mortality of tuberculosis in Germany during recent years, in the face of all the efforts of physicians and sanitarians, clearly places the responsibility on the deplorably unhygienic conditions in which the peasantry and villagers live and the lack of a sufficiency of wholesome food. By order of and with the assistance of the imperial government Dr. Jacob undertook an exhaustive investigation into the housing, food and conditions of living of the entire population of the little district of Hummling, containing thirty-nine villages, in the province of Hanover, that section having been selected because of its bad preeminence in tuberculosis returns and mortality.

---

*"Tuberculosis" June, 1911, p. 228.

Professor Jacob arrives at the conclusion that nuisances prejudicial to health are often much more serious in the country than in the city. Worst of all he declares is the condition of the dwelling houses, both as regards their construction and their interior arrangements. Out of 3250 houses inspected in this little district. fifteen hundred seventy-one or very nearly one-half were absolutely condemned from a hygienic point of view. A matter for serious apprehension was, above all, the utter disregard of the most elementary precepts of hygiene which characterized the state of the bed-rooms and more especially of the lofts. These are greatly overcrowded and the fact of several persons, among whom are often individuals with open tuberculosis, sleeping together in the same bed, is most significant. Sanitation, proper heating and cleanliness are absolutely neglected. Privies, wells, dung heaps, etc., are on most farms in an utterly noisome condition. Tuberculosis may certainly be described in the country as well as in the city as a disease connected with bad housing. Similar insalubrious conditions were found in most households in the villages, also. The village schools are almost without exception obsolete buildings. The improvements of modern school hygiene are entirely wanting. The class rooms are crowded beyond all reason, so that the teachers can effectively supervise neither the bodily nor the mental well-being of their pupils. Children constantly arrive in the school room with their clothing wet through, often without having had a warm breakfast or dinner. The consequent lessening of the powers of resistance during the years they attend school contributes to a great extent to their becoming affected with tuberculosis of the glands.

The mortality among nursing children is found to be highest in those sections where the feeding with mother's milk is least common. In feeding older children with cow's milk the amount given is almost without exception entirely insufficient. The average quantity of milk consumed by the peasant family is less than half that which is used by a family in town. Eggs, meat and vegetables are also insufficiently eaten in the country. The want of sufficient nourishment of the rural inhabitants leads to a gradual decrease of their bodily power of resistance and consequently to an increased disposition to tuberculosis.

Very few people in the country have the slightest notion of personal cleanliness or of how to keep their skin in a healthy state. The filthy condition of their skin and finger nails, and the weakening of the system through neglect of proper care in this respect are responsible for much spread of tuberculosis.

Care of the teeth is practised almost nowhere in the country. Hardly a single child attending school is in possession of a normal set of teeth—under that age not more than twenty per cent. Caries of the teeth stands in closest connection with origin of tuberculosis of the glands in children.

Tuberculosis is also widespread among adults in the country. It often happens that in the space of a few decades nearly all the members of one and the same family fall victims to consumption. In many villages there exist perfect hotbeds of contagion. The origin of the disease in adults may often be traced back to infection in the home in childhood.

Prof. Jacob insists on the importance of seeking our information on the spot, at the homes of the people. Specially trained dispensary nurses are proper persons to make the investigation, but they should be provided with proper blanks on which to record the results. Where it is possible, especially in the case of open tuberculosis, it is desirable that the Dispensary physician should confirm the findings of the nurses. The medical examination of school children should be insisted on and even extended to children under school age.

The Professor finds in the dangerously insanitary conditions existing in the country an important explanation of the growing exodus of the rural inhabitants to the towns. In order to bring about an improvement in the nourishment of people living in the country, he urges that appropriate instructions on this matter should be systematically given, especially to the women.

Instructions of the rural population as to the causes of tuberculosis and the means of combating the same by the wide distribution of circulars, articles in the public press, lectures and exhibits is very properly insisted on. Disinfection should be compulsory and gratuitous. Healthy children should be removed from houses which are infected with tuberculosis and provision should be made for them elsewhere·

In order to carry out a thorough reform in the housing accommodations in the country, radical measures must be taken by the authorities. Great importance is to be attached to a better arrangement of the interior of the dwellings and to the correction of habits of living.

New school houses should take the place of the present obsolete and generally overcrowded rural and village school houses and they should be equipped with the appliances of modern sanitation. Special stress should be laid on the intelligent nourishment of school children, their habits and personal cleanliness.

The proper care of the teeth should be made effective through gratuitous distribution of tooth brushes, and through systematic control by school dentists.

Professor Jacob's final recommendation is as follows: "Curable cases should as soon as possible after the onset of the illness be sent to a Sanatorium."

That the conditions described by Prof. Jacob are by no means confined however to the little district of Hummling, is evidenced by the appearance in the same journal of an interesting article by Councillor Buch* of Limburg, in the district of Wiesbaden, founded upon his official experience of many years in two distinct and extensive districts. His subject is "The Campaign against Tuberculosis in the Country." He concludes that tuberculosis is spread in the rural districts in the same proportion as in the towns and industrial centres. Therefore it is necessary to oppose it there just as energetically as elsewhere, but the campaign is most difficult in the former because of the great distances by which dwellings are separated. He advises as preventive measures the creation of sounder conditions of living, by the introduction of public water supplies and sewers, and the proper construction of dwellings, the introduction of better nourishment by teaching the people how to cook; the abolition of dirt and dishonesty in the trade in food stuffs, the protection of the public from the dangers of bad meat and polluted milk, the appointment of school physicians and school dentists, the enlightenment of the people by means of lectures, pictures, etc., sanatorium treatment, seaside infirmaries for children suffering from glandular tuberculosis, official examination of sputum and clinics for the better instruction of physicians in the diagnosis of the disease.

It is interesting and gratifying to notice to how great an extent these latest findings and recommendations of a learned German expert and official have been anticipated by those of our own Department and its officials. From the very first, our constant insistence has been upon a sufficient amount of nourishing and properly cooked food as essential to building up the resistance of our people to the invasion of tuberculosis and especially during the period of infancy and childhood.

While our rural and semi-rural populations fortunately do not suffer from the dire poverty that weighs so heavily upon the German peasantry, and while the failure to secure a wholesome, nourishing diet results with us oftener from ignorance than from absolute inability to purchase proper food, yet the strictures which the Professor makes upon the character of the food habitually used by our working people and especially on that on which their children are nourished or mal-nourished, apply with almost equal force. For more than a year we have been carrying on a propaganda of nutrition through our lectures and dispensary nurses. A dietary for the tuberculosis sanatorium founded on a study of chemical analyses of the various food products has been in use since last spring, a bill of fare having been prepared for each meal for each day in the week.

---

*"Tuberculosis," June, 1911, p. 215.

The point however which has greatest significance for us is the statement that "tuberculosis is a disease of bad housing as well in the country as in the city."

Of course the manner of construction of the houses of the German peasantry is peculiarly conducive to the propagation of the tubercle bacillus. Built of massive blocks of undressed stone, with very low ceilings, one story high, with a low loft reached by a ladder, with windows little more than slits admitting a minimum of light and air, always greatly overcrowded, sometimes hundreds of years old, the walls saturated with the exhalations of untold generations of human beings in sickness as well as in health, dripping with moisture on sudden changes of temperature, no better culture chambers for bacteria could be imagined.

The almost superstitutious dread of night air on the part of much of our farming population and the fetid atmosphere in which too many of them sleep the long winter night through with their children, especially those ordinarily known as Pennsylvania Dutch or Germans, is a well known fact. The same is true in our mining villages. Nothing in the over crowded condition of city tenements, black as it has been painted, is worse than the herding together of human beings in some of our lumber and mining camps. Up to the present time our Legislature has made provision against over-crowding and general insanitary construction of dwellings in cities only and that indirectly, by authorizing the municipal councils to pass ordinances regulating the same. It is a matter for serious consideration whether our people living in the country should not be protected against the dangers arising from over crowding and defective ventilation as well as those who live within city limits, for while it is true, as recently pointed out in a previous bulletin, that the statistics of tuberculosis in rural districts need to be revised in order to eliminate the error arising from the fact that so many cases acquired in the city go home to the country to die, and thus become an unfair charge on the rural mortality reports, it is not less true in America than in Germany that a considerable proportion of tuberculosis is due to the filthy, crowded and especially the ill-ventilated condition of habitations in the country and small villages. This fact was strikingly brought out in the exhibit of our Department at the international Congress on Tuberculosis held at Washington in 1908 in a chart "showing graphically (in the words af the catalog) the possibilities of house infecton when indifference or ignorance exists on the part of tuberculous sufferers. Tuberculosis under such conditions becomes a wide spread menace not confined to the over crowded tenements of large cities."

HISTORY OF TWO FARM HOUSES IN PENNSYLVANIA.

1880 to 1901.—Occupied by a family consisting of father, mother and six children of whom four died of tuberculosis.

1902 to 1903.—Occupied by a family consisting of father, mother and eight children—moved on account of sickness—at present father and one child have tuberculosis.

1904.—Occupied by a family consisting of father, mother and eight children. At present four children have well developed tuberculosis and three are suspects.

1905.—Occupied by a family consisting of father, mother and two children. Father, son of first occupant, died of tuberculosis.

Total, five deaths, six living cases, three suspects up to Sept. 1908. (Since then the three suspects have proved to be tuberculous.)

"The above house is located in Cumberland county. The following is a history of another farm-house in Juniata county."

History previous to 1898. No definite history of tuberculosis although there is reported one suspicious case, a negro who underwent amputation of one leg because of "some disease."

1900-1902.—Family of J. E. moved into house 1898. Husband's family history, negative. Wife's history, doubtful. First case Mrs. J. E. died 1902. During 1902 tuberculosis developed in the husband, one son and two daughters. A short time after moving from the house one other daughter developed tuberculosis and at the present time one additional daughter is under observation, there being strong evidence of early infection. The son has since died and another daughter has become infected.

Of the J. E. family therefore, within six years after moving into the house six members died of tuberculosis, a seventh has since died and three are still living, all infected.

1902-1904.—T. moved into house 1902. Family history both Mr. and Mrs. T negative. 1903 one son, one daughter and Mrs. T. developed tuberculosis and died. One son and one daughter have developed the disease and are now under treatment. (The daughter who died was married. The husband and their child are both found to be infected.)

A Mrs. M. not connected with this family and having a good family history was a frequent visitor during the occupancy of the house, and in 1904 contracted tuberculosis.

1904-1906.—Family of R. L. occupied the house. Family history negative. In 1905 one son contracted tuberculosis and died. During the occupancy of the house three other members of the family developed tuberculosis.

An attempt has been made of recent years to demonstrate that the principal efforts of sanitary authorities should be directed to providing refuges for those in the advanced and dying stages. Apart from the self evident fact that if every case were arrested in its incipiency there would never be any cases in the late stages requiring sanatorium treatment, taking cases as we already find them in every stage, men who have given the most serious thought to the question have decided with Prof. Jacob that while provision must be made for sanatorium treatment in both late and early stages, the latter making an especial appeal upon our sympathies, yet the effort of the state officials, which must be controlled rather by economical than by philanthropic motives, should be primarily directed to checking the disease at its onset. This coincides entirely with the policy of this Department. One of those who has expressed himself very convincingly on this point is Dr. Herbert Maxon King, Physician in Chief of the Loomis Sanatorium, in the State of New York, who has written in part as follows:

"One of the most insistent demands of the prevention propagandists of the past few years has been for hospitals for advanced cases with the idea that this class of consumptives is the most dangerous to the community as a source of infection. That this class is the most helpless and makes the strongest appeal to our sympathies, and that as a rule it makes the most urgent demands upon charity, I do not question. The claims of this group of hopeless invalids upon human charity are incontestable. Whatever else may be neglected in this anti-tuberculosis campaign, this call must be answered or we forfeit all claim to humanitarian sentiment.

"But let us not make the blunder of assuming that by providing asylums for this hopeless and forlorn class of sufferers we are thereby removing from the community the whole or even the chief source of danger. That such an assumption is an error, I am convinced. We know to-day that the chief source, we might almost say practically the only source of infection in human tuberculosis is the phthisical patient with bacillary sputa. A patient in the last stages of consumption is supposed to produce a much larger quantity of sputum containing an enormous excess of bacilli as compared with the ambulant case. The former is, moreover, of necessity, confined within narrow limits as to space, and consequently within such limits there must be a very much higher concentration of virus, and a correspondingly higher degree of infectivity. In some measures this is true, although the difference between the virus producing capacity in the two cases is much less than is generally supposed.

"In the course of some recent observations made at Loomis Sanatorium it was found that in a group of twenty-five far advanced, bedridden cases the average amount of sputum per patient per day was

65 grammes, with a bacillary content which may be represented by the fraction 21-25 (the denominator representing a theoretical maximum of this group.) At the same time it was found that in a group of twenty-five ambulant cases, in good general health and appearance —such patients indeed as would pass in an ordinary community unrecognized as consumptives—the average amount of sputum per patient per day was 42 grammes, with a bacillary content of 16-25, estimated in like manner as in the former case. It will be seen therefore that the difference in this respect is much less than one would naturally suppose.

"Now in the case of the last stage consumptive the zone of danger is necessarily brought within very narrow limits, although there is, of course, a higher concentration of the virus within these limits. I am assuming that we are dealing with careless patients and uninstructed attendants. But the ambulant consumptive, with his forty-two grammes of bacillary sputa, has a wide range of activity; he is not only on the streets and in the shops, but in places of amusement, churches, and social gatherings, and enjoys such intimacy of contact with his fellows of both sexes as is limited only by his inclinations and his conscience.

"For my part, it has always seemed to me, therefore, that of the two, the ambulant case, with a bacillary sputum, is a far more prolific source of infection than is the last stage, bed-ridden patient, and when from the point of view of prevention it is argued that institutional provision for last stage cases is all-sufficient, I confess I cannot agree. Institutional care and instruction must be provided for the early cases as well; indeed from this point of view of prevention sanatoria for early stage, or, to put it differently, hopeful cases are to my mind the more important and desirable of the two."

In addition to the arguments adduced by Dr. King it must be remembered that, as the disease advances to its latest stages when the tubercle bacillus is compelled to battle for its existence with those of the mixed infections, its vitality and hence its virulence are very considerably impaired. It is at this time that we are more apt to find the branched forms discovered by Dixon, which indicate involution or approaching dissolution.

It appears then that the latest utterances of those qualified to give an opinion both in this country and in Germany sustain the conclusion not only that Sanatorium treatment of tuberculosis has great advantages over home treatment in almost all conditions of life, but that governmental aid in this matter should be especially extended as far as possible in the early stages of the disease. And furthermore that the sociological side of the problem, as worked out in our State Dispensaries especially commends itself to sanitarians in Europe.

P Hel

Pennsylvania Health Bulletin

No. 28. HARRISBURG, PA. OCTOBER, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE PREPARATION OF THE BIOLOGIC PRODUCTS DISTRIBUTED BY THE PENNSYLVANIA DEPARTMENT OF HEALTH

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 28. HARRISBURG, PA. OCTOBER, 1911.

Entered as Second Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

THE PREPARATION OF THE BIOLOGIC PRODUCTS DISTRIBUTED BY THE PENNSYLVANIA DEPARTMENT OF HEALTH.

THE PRODUCTS OF THE TUBERCLE BACILLUS.

In the Medical News of October 19, 1889, attention was called to a Morphologic Condition of the tubercle bacillus which had never previously been observed. This change consisted of modifications of the organisms which suggested possible involution forms. These forms represented a difference in the degree of virulence which led to the subcutaneous injection of these somewhat devitalized organisms into tuberculous animals with a result of producing different degrees of immunity. Having succeeded in cultivating tubercle bacilli in a number of tubes to a stage at which few or no ordinary rod form bacilli could be microscopically found in the cultures, inoculation into guinea pigs, and rabbits of these atypical and avirulent forms of bacilli resulted in a short febrile stage with an enlargement of the lymphatic glands located in the neighborhood of the point of injection. This condition, however, soon passed away and the animal recovered, and afterwards exhibited a high degree of resistance against the effects of virulent tubercle bacilli. On further experimentation it was shown that by treating a mass of tubercle bacilli with ether and abstracting with a salt solution, a product was obtained that, when injected into the animal economy, changed the condition of the tissue cells and thereby prevented the growth of the tubercle bacilli. The result of the work was first published in the Medical News of January

17, 1891, page 87. This work was continued by him until two methods of preparation had been published from time to time, as improved technic had been adopted resulting in the method hereinafter outlined.

TUBERCLE BACILLI EXTRACT.

This product is prepared from living organisms. The tubercle bacilli are grown on 4 per cent. glycerine veal broth for a period of six to eight weeks at a temperature of $37\frac{1}{2}$° C. They are removed from the incubator and collected upon hard filter paper. The filtrate of glycerine broth upon which they are grown is discarded. An equal quantity, by weight, of tubercle bacilli of the bovine and human type is used. The mass of organisms is partially dried of the excess of moisture by placing between two sterile filter papers and afterwards placed in a dish in the incubator for twenty-four to forty-eight hours. The dried organisms are then washed in an excess of ether, which is allowed to act until it has removed all of the water and glycerine. The organisms are then subjected to an excess of fresh ether and washed in the same for six hours to soften the wax of the bacilli. This fat separates so that it collects at the bottom of the vessel and is removed by a Pasteur pipette. After removing the second addition of ether, the mass is allowed to dry until no ether odor is perceptible. After the mass of tubercle bacilli have been thoroughly dried, it is ground in a mortar and suspended in physiologic salt solution in the proportion of one part of the ground mass to five parts of an 8 per cent. salt solution. This suspension is carried in a shaking machine for eight to ten hours and then allowed to stand for several days at room temperature. It is finally passed through impervious bacteria filters several times and the filtrate is examined microscopically, bacteriologically and physiologically. Culture tests are made to determine its freedom from contaminating organisms and guinea pigs are inoculated to ascertain that it contains no living tubercle bacilli. One Cc of this extract represents .5 gram of the organisms, and is known as the stock solution from which serial dilutions are made. This solution is sterile, though a preservative of one-half per cent. of carbolic acid is added to prevent any subsequent contamination.

This extract is supplied in syringes in the following series of dilutions, so that the doses may be increased as deemed advisable.

Dilution No. 1, containing the extract from one milligram (0.001 gram) of tubercle bacilli.

Dilution No. 2, containing the extract from ten milligrams (1.01 gram) of tubercle bacilli.

Dilution No. 3, containing the extract from twenty milligrams (0.02 gram) of tubercle bacilli.

Dilution No. 4, containing the extract from thirty milligrams (0.03 gram) of tubercle bacilli.

Dilution No. 5, containing the extract from forty milligrams (0.04 gram) of tubercle bacilli.

Dilution No. 6, containing the extract from fifty milligrams (0.05 gram) of tubercle bacilli.

Dilution No. 7, containing the extract from sixty milligrams (0.06 gram) of tubercle bacilli.

Dilution No. 8, containing the extract from seventy milligrams (0.07 gram) of tubercle bacilli.

Dilution No. 9, containing the extract from eighty milligrams (0.08 gram) of tubercle bacilli.

Dilution No. 10, containing the extract from ninety milligrams (0.09 gram) of tubercle bacilli.

Dilution No. 11, containing the extract from one hundred milligrams (0.10 gram) of tubercle bacilli.

Dilution No. 12, containing the extract from one hundred ten milligrams (0.11 gram) of tubercle bacilli.

Dilution No. 13, containing the extract from one hundred twenty milligrams (0.12 gram) of tubercle bacilli.

Dilution No. 14, containing the extract from one hundred thirty milligrams (0.13 gram) of tubercle bacilli.

Dilution No. 15, containing the extract from one hundred forty milligrams (0.14 gram) of tubercle bacilli.

Dilution No. 16, containing the extract from one hundred fifty milligrams (0.15 gram) of tubercle bacilli.

Dilution No. 17, containing the extract from one hundred sixty milligrams (0.16 gram) of tubercle bacilli.

Dilution No. 18, containing the extract from one hundred seventy milligrams (0.17 gram) of tubercle bacilli.

Dilution No. 19, containing the extract from one hundred eighty milligrams (0.18 gram) of tubercle bacilli.

Dilution No. 20, containing the extract from one hundred ninety milligrams (0.19 gram) of tubercle bacilli.

It is suggested that in ordinary cases, the injection of each Dilution be repeated at least five (5) times before changing to the next number, or next stronger Dilution.

The physician should bear in mind the general condition of the patient during the administration of this treatment and the same suggestions as are later outlined for the administration of the suspension of dead tubercle bacilli are applicable to this product. However, it is to be remembered that the tubercle bacilli extract is *toxic* and must be used with caution. Small repeated doses injected into normal guinea pigs cause no effect upon their temperature, weight or condition.

SUSPENSION OF DEAD TUBERCLE BACILLI.

The preparation is a suspension in physiologic salt solution of tubercle bacilli which have been de-greased by prolonged treatment with alcohol and ether. The tubercle bacilli are grown on 4 per cent. glycerine veal broth for from six to eight weeks at a temperature of 37½° C. After the cultures are removed from the incubator, the tubercle bacilli are killed by subjecting them to steam sterilization for one hour. The tubercle bacilli are then collected on hard filter paper and the filtrate is discarded. An equal quantity, by weight, of tubercle bacilli of the human and bovine type is used. This bacillary mass is dried of the excess moisture between layers of sterile filter paper and afterwards placed in the incubator at 37½° C. for 24 hours. It is then dried in a vacuum dessicator over either sulphuric acid or calcium chloride, until the mass has become dry and brittle, exhibiting a brownish color. The dried tubercle bacilli are then disintegrated by grinding in a mortar and afterwards placed in a soxhlet. The first extraction is done with absolute alcohol and is continued until the brown color of the distillate has disappeared, which requires from two to four hours. The alcohol is then replaced by ether and the extraction continued until the ethereal distillate is practically clear. The extraction by ether necessary to bring about a clear distillate requires from eight to ten days of ten hours each. When the extraction is complete, the mass of tubercle bacilli is dried twenty-four hours at 45° C. The resulting mass of tubercle bacilli consists of dirty, yellowish gray granules, which break up easily into small particles. These particles are not soluble in water, salt solution, alcohol or ether. They are ground up into a fine powder in a porcelain ball mill. Definite quantities of the tubercle bacilli powder are inoculated into normal guinea pigs to determine its freedom from living tubercle bacilli. Suspensions are then prepared of the degreased ground bacilli in physiologic salt solution. These suspensions are proved to be sterile by microscopic and cultural examinations. As a further precaution against subsequent contamination one-half per cent. of carbolic acid is added.

Suspensions of the following strengths are prepared and supplied in syringes ready for injection.

Dilution No. 1, containing one one-thousandths of a milligram (0.000,001 gram) of dead tubercle bacilli.

Dilution No. 2, containing one one-hundredths of a milligram (0.000,01 gram) of dead tubercle bacilli.

Dilution No. 3, containing two one-hundredths of a milligram (0.000,02 gram) of dead tubercle bacilli.

Dilution No. 4, containing three one-hundredths of a milligram (0.000,03 gram) of dead tubercle bacilli.

Dilution No. 5, containing four one-hundredths of a milligram (0.000,04 gram) of dead tubercle bacilli.

Dilution No. 6, containing five one-hundredths of a milligram (0.000,05 gram) of dead tubercle bacilli.

Dilution No. 7, containing six one-hundredths of a milligram (0.000,06 gram) of dead tubercle bacilli.

Dilution No. 8, containing seven one-hundredths of a milligram (0.000,07 gram) of dead tubercle bacilli.

Dilution No. 9, containing eight one-hundredths of a milligram (0.000,08 gram) of dead tubercle bacilli.

Dilution No. 10, containing nine one-hundredths of a milligram (0.000,09 gram) of dead tubercle bacilli.

Dilution No. 11, containing ten one-hundredths of a milligram (0.000,10 gram) of dead tubercle bacilli.

Dilution No. 12, containing eleven one-hundredths of a milligram (0.000,11 gram) of dead tubercle bacilli.

Dilution No. 13, containing twelve one-hundredths of a milligram (0.000,12 gram) of dead tubercle bacilli.

Dilution No. 14, containing thirteen one-hundredths of a milligram (0.000,13 gram) of dead tubercle bacilli.

Dilution No. 15, containing fourteen one-hundredths of a milligram (0.000,14 gram) of dead tubercle bacilli.

Dilution No. 16, containing fifteen one-hundredths of a milligram (0.000,15 gram) of dead tubercle bacilli.

It is suggested that in ordinary cases, the injection of each Dilution be repeated at least five (5) times before changing to the next number, or next stronger Dilution.

If it is desired to give a larger dose than Dilution No. 16, it is advisable to make two injections; one of the highest dilution and another with the dilution corresponding to the next of dosage desired. This method prevents the depositing of a large number of dead tubercle bacilli at one point.

The physician in charge should use his judgment as to how the patient feels in general, depending, of course, upon the manifestations of each one's condition as to the strength, the weight, the sleep, the circulation, the appetite, the cough and the temperature. When these are good, the patient presents a favorable picture along the line of recovery and moderate reaction may be tolerated. It should be the aim of the physician administering the treatment to increase the dosage with such care as not to produce a severe reaction during the entire time of treatment. However, if a severe reaction should occur, it is advisable to return to the next, or possibly even the second weaker dilution.

PRODUCTION OF DIPHTHERIA ANTITOXIN.

Diphtheria antitoxin is the soluble substance or substances liberated by the animal organisms in its endeavor to detoxicate or neutralize the poisons or toxins of the bacillus of diphtheria. This antitoxin is present in the circulation of immunized animals and the blood serum from such animals has until five years ago been used for treatment of diphtheria. In 1906, Gibson found by isolating the globulins of the blood serum of animals immunized against diphtheria toxin that he was able to obtain approximately the same quantity of antitoxin as was contained in the volume of blood serum before the precipitation of the globulins. During the past three years, this method has been improved upon by Banzhaf, who found that the globulins which were insoluble in saturated sodium chloride solution carried with them no antitoxin, as well as the fact that the soluble globulins, which on heating became insoluble, also contained no antitoxin. With this knowledge a practical method of eliminating much of the non antitoxic portion of the serum was perfected. This latter product has many advantages over the plain horse blood serum and is known as concentrated and refined diphtheria antitoxin. It permits a larger dose in antitoxic units to be administered in a smaller volume. Again it does away with many of the substances in the blood which have no bearing upon immunity against diphtheria. It has also been shown that the rashes following the injection of blood serum are greatly reduced, as well as other disagreeable symptoms following the injection of horse serum and termed "Serum Sickness." For the past three years nothing but concentrated and refined diphtheria antitoxin has been supplied by the Department of Health.

A great variety of animals may be immunized against diphtheria antitoxin, but the horse is the one selected for the production of diphtheria antitoxin, owing to its size and the high degree of immunity obtainable.

The first step in the manufacture of diphtheria antitoxin is the production of diphtheria toxin. Virulent diphtheria bacilli are planted in flasks of bouillon of proper chemical composition. These bacilli as they multiply produce toxin of the specific poison of diphtheria and after six to eight days in the incubator at 37½° C., the bouillon contains as much toxin as will be liberated by one particular crop of organisms. The bacilli are now killed in the flask in which they are grown by the addition of trikresol or carbolic acid, the former being preferable, owing to its less irritating effects. The dead diphtheria bacilli are removed by filtration through porcelain filters. The filtrate is charged with the toxin that is liberated during the growth of the organisms and is spoken of as diphtheria toxin. The strength of the toxin is carefully determined by finding the minimum lethal dose for a guinea pig of 250 grams weight. For convenience in administering the toxin, its strength is also measured in factors. A factor represents 100 times the minimum lethal dose of toxin required to kill a guinea pig of 250 grams weight in ninety-six hours.

Only healthy, vigorous horses are used for the production of the antitoxin. They are first examined physically by a competent veterinarian and afterwards subjected to tests for tuberculosis and glanders.

The horse receives an initial injection of toxin approximately ten times the fatal dose for a guinea pig, this small dose often producing a marked thermal and constitutional reaction. By repeated and increasing injections of toxin, the horse develops an immunity. However, this immunity varies greatly in different horses, and experience has shown that not more than 25 per cent. of all horses will produce diphtheria antitoxin of sufficient strength to be profitable from a commercial standpoint. It requires from four to six months to determine this fact. The doses of toxin are increased on each injection, until after four to five months the animal may be receiving several thousand times the initial dose of toxin. Sample bleeding are then taken from the animal and the antitoxic value of the serum determined. If it is shown that the animal is producing antitoxin testing over 300 units per Cc, the injection of the toxin is discontinued for a period of eight days, at the end of which time it is believed that the maximum value of the serum is attained.

The animal is then bled from the jugular vein into sterile bottles containing sodium citrate. This operation is done under perfectly aseptic conditions. The amount of sodium citrate added is 10 per cent. of a 10 per cent. solution or 1 per cent of sodium citrate to the total volume contained in the bottle.

The horse is allowed to stand for a few days and then is re-injected with toxin for another period of a month or six weeks and again bled, this procedure going on from time to time until the animal ceases to produce antitoxin of a value of 300 units per Cc of blood serum. This length of time varies greatly in different horses.

The addition of the sodium citrate prevents the blood from clotting and allows the organized portions of the same to settle to the bottom of the receptacle leaving a straw colored plasma above. This supernatant plasma is drawn off and concentrated and refined.

The first step in the concentrating and refining of the antitoxin is the heating of the plasma at 56° C. for 72 hours. Afterwards the globulins carrying the antitoxin are precipitated, thereby eliminating all of the other constituents of the blood which have no bearing upon the antitoxic value. Such salts as ammonium sulphate, magnesium sulphate, sodium sulphate, sodium chloride in acid solutions or mixtures, all suffice for the purpose of precipitation, but for a sharp separation from non-antitoxic proteins, ammonium sulphate gives the best results. The precipitate is further purified by dissolving and again re-precipitating, thereby eliminating more of the non-antitoxic pseudo-globulins, so that the final sodium chloride extraction and precipitation with acid gives the purest preparation possible. To make the product conform as nearly as possible to the body fluids with which it is to mix, the antitoxin solution is dialyzed from four to five days in running water and then made very slightly alkaline with sodium carbonate and the addition of one-half of one per cent. of sodium chloride. The antitoxin solution is filtered through paper and afterwards through porcelain filters into sterile bottles. It is then tested for potency and sterility, and experimental animals, such as guinea pigs, are injected with large doses to test for any untoward effects. In order to safeguard the antitoxin from any subsequent contamination, a preservative is added, such as trikresol or chloroform.

A unit of diphtheria antitoxin represents the amount of antitoxin which will just neutralize 100 minimum fatal doses of diphtheria toxin for a 250 gr. guinea pig.

After the antitoxin has been carefully and accurately tested for sterility and potency, it is filled into syringes in an aseptic manner from a graduated burette, the amount placed in the syringe depending upon the strength of the antitoxin and the number of units that are desired. The syringes supplied by the Department of Health are of three sizes—1,000 units, 3,000 units and 5,000 units. There are over 600 diphtheria antitoxin distributing stations throughout the State.

TETANUS ANTITOXIN.

The preparation of tetanus antitoxin is so similar to that of diphtheria antitoxin that it is not considered necessary to give a detailed description of the same. The preparation and standardization is carried out with the greatest care. It is handled under the strictest aseptic conditions until sealed in the syringe. This product is supplied in syringes containing 1,500 units and is recommended as a prophylactic measure, in cases where wounds have been inflicted that are likely to subject the patient to tetanus. It is primarily intended for immunization purposes only, as the results obtained from therapeutic uses of tetanus antitoxin have not proved it to be of great value after symptoms of the disease have appeared. There are approximately 70 distributing stations for tetanus antitoxin throughout the State. These stations carry a supply at all times.

SMALL POX VACCINE VIRUS.

Small pox vaccine, generally known as vaccine virus, is the material obtained from the pustules on a calf inoculated with the disease "vaccinia." The method followed in obtaining this material is to inoculate a young calf with small pox vaccine material obtained from another calf. This strain of seed material is kept active by transfers from animal to animal at various periods.

The calves are carefully selected and examined by a veterinarian to determine their physical condition and afterwards tested with tuberculin to eliminate tuberculosis. If the animal satisfactorily passes all of these tests, it is then thoroughly cleansed and inoculated. The operation consists in shaving the hair from the undersurface of the abdomen and the inner portion of the thighs. The field of inoculation is thoroughly cleansed with antiseptics and afterwards with sterile water. The inoculation is done by making linear incisions about one-half inch apart over the entire surface of the shaved portion of the abdomen and the inner portions of the posterior limbs. These incisions are made through the epidermis of the skin, but not deep enough to draw any appreciable amount of blood. The vaccine material is rubbed into these linear incisions with the aid of a sterile spatula or stroked along the incision with a sterile flat glass rod. The animal is then removed to the incubation stable, which is maintained at a temperature of 70° to 80° F., and kept under careful observation. Morning and evening temperature observations are taken and recorded. The animal is given carefully prepared food, which consists of liquid and semi-solid material, thereby causing no dust in the stable. At the end of the incubation period, or approximately six days from the time of vaccination, the vaccine material is removed by the aid of a curette or Volkmann spoon. Of course, during the entire time from the vaccination until the removal of the vaccine, the animal is kept under the most aseptic conditions that have ever been devised. The vaccination of the animal and the removal of the vaccine takes place in a room that is aseptic in every way possible. Upon the removal of the vaccine pulp, glycerine is added and it is ground into a homogeneous mass, after which it is stored at a temperature below freezing. Each lot is tested for bacteria in general, and special tests are made for such organisms as those of tetanus, anthrax, etc. Before it is supplied to the Department of Health, its potency is accurately determined by the inoculation of an animal with a sample of the same.

After the vaccine material is removed from the calf, a careful autopsy is held upon the same, and if any evidence of a diseased condition is found, the vaccine is discarded.

Tubercle bacilli products, which include the tubercle bacilli extract and the suspension of dead tubercle bacilli, are now being prepared in the Laboratories of the Pennsylvania State Department of Health under the direction of S. H. Gilliland, M. D., V. M. D., and are supplied to the various state tuberculosis dispensaries and sanatoria throughout the Commonwealth of Pennsylvania and are to be administered under the supervision of the Directors and Chiefs of these institutions. At the time of the organization of the Department of Health, it did not seem feasible to arrange for the production of the diphtheria and tetanus antitoxin and the small pox vaccine, or until it was definitely determined what demand would be made upon the Division of the Distribution of Biologic Products for the same. The production of antitoxin and vaccine requires men trained particularly in serum therapy, as well as a large outlay for apparatus, buildings, live stock, stock, etc. It was therefore considered best to obtain these products from commercial houses with a satisfactory reputation.

The antitoxins and the vaccine virus have been prepared and supplied by different Biologic Laboratories in the State of Pennsylvania. The Laboratories now producing the antitoxins and vaccines are duly licensed by the U. S. Public Health and Marine Hospital Service, in accordance with a Federal Law.

The demand made upon the Division of the Distribution of Biologic products is increasing each day, and it is believed that it would be to the advantage of the Pennsylvania State Department of Health if the Division of the Laboratories could be increased to such an extent as to prepare all of the biologic products used and distributed under its direction.

Pennsylvania
Health Bulletin

No. 29. HARRISBURG, PA. NOVEMBER, 1911.

JUN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE FOUNDATIONS OF STATE MEDICINE.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 29. HARRISBURG, PA. November, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

THE FOUNDATIONS OF STATE MEDICINE.

When our people err in the commission of sanitary sins it is as a rule through ignorance rather than wilfully. What is needed it is give them the necessary instruction, to point out their mistakes and to indicate the steps necessary to be taken to remedy them, in order to induce them to abandon their insanitary ways of living or of conducting their business, and adopt the measures required to banish the evils which flow from their previous neglect. The mistake which so many of our citizens make is that they are not awake to the fact that individual acts affecting injuriously the public health must be modified so that they may not place in danger the interests and rights of their fellow-men.

It therefore becomes necessary for the Government, which in this country simply means the people acting in their collective capacity, to consider just how far it is possible to permit certain individual acts, and how far it becomes necessary to restrict them as interfering with the health of the general public. It is for this reason that the people of this Commonwealth, through their law makers, have placed upon the statute books the most comprehensive and effective legislation for the protection of the public health, to which we owe it that it has been possible for us to accomplish results that have attracted the attention of sanitarians in all parts of the United States.

State Medicine, the Root of Happiness and Success.

It is not too much to say that on State medicine depends the happiness of our people and the success of the nation. The nation which is vigorous in its individual citizens will be strong as a whole. It is not so much the fire and sword of the Goth that devastated the fair fields of Italy and made Rome a heap of ruins as the physical degeneracy of a race enfeebled by luxury and the diseases which luxury entails, and ravaged by pestilence.

It is health that nerves the arm that wields the hammer and the sword, that gives keeness to the eye that sights the gun and penetrates the mysteries of the microscope, that lends acuteness to the brain equally of the statesman, the inventor and the merchant. Without it the arm falls inert, the eye grows dim and the brain dull. Health is the great engine whose throbs, like those of the motor of a great Exposition, touched by electrical fire, sends energy through all the great machinery of a peopled continent.

It is not enough that we should acquaint ourselves with the general principles of this great science of the health of a nation. We must become familiar with the minutest details of the methods by which those principles may be put into practical application.

No more striking object-lesson of this truth could have been given than the experience of two great nations in their conduct of recent wars: America, the boasted seat of applied science and center of illumination, possessing the full knowledge of the laws of hygiene, lost many fold more of her brave troops on her own soil by preventable disease than by shot and shell at the seat of hostilities. Japan, just emerging, as we are accustomed to phrase it, from the sleep of ages and who had been sitting at the feet of other nations to learn the rudiments of hygiene, made such admirable practical use of her knowledge of the principles thus acquired that she astonished the whole civilied world by demonstrating the possibility of conducting a war on a gigantic scale and under most adverse conditions, in which the deaths and disabilities from disease should be actually less than those from wounds; in which, indeed, the mortality from general causes should scarcely exceed those under ordinary conditions of life. As in war so in peace. It is not enough to possess an intimate knowledge of general laws; we must know how practically to apply these laws. And, more than that, we must possess sufficient self-control, both individually and collectively, to be willing to submit to the enforcement of the legal enactments designed for their application. Of what avail would all the wise precautions of the Japanese army surgeons have been if their troops, had, like our volunteers, gorged themselves with all manner of indigestible food and drunk from every wayside pool, instead of confining themselves to the army ration and using only such water as was allowed by the medical officers. The Japanese soldier was so thoroughly a patriot that he was willing to deny himself, and to control his appetites, and he had sufficient intelligence to know that the restrictions placed on him by the authorities were designed purely for his own good and to make him better fitted to serve his country.

Sanitary Laws not Antagonistic to True Personal Liberty.

It is idle to prate of the enforceemnt of sanitary laws as an infringement of personal liberty. Submission to reasonable personal restrictions intended for the welfare of all is the very foundation stono of civilized liberty. The individual who insists on what he is pleased to call his own rights in defiance of law and to the detriment of the common weal is "an undesirable citizen of the republic." If we are to aim, in the language of another, "to render growth more perfect, decay less rapid, and life more vigorous" in civilized life we must give up many primitive or individual liberties to insure adanced civilized liberties and to permit a free social and commercial intercourse.

One more factor in bringing about the wonderful achievement of the Japanese army must be mentioned, and that is the high rank accorded to their medical and sanitary departments. In their particular branch of the service these men were supreme. In all great movements they were consulted. Unless a military necessity prevented absolutely they supervised routes of march, sources of water supply and sites for encampment.

Due Recognition Required for the Medical and Sanitary Service.

So long as the medical service is made subordinate or inferior to the strictly military service in our own army, so long will repetitions of the disgraceful slaughters of Camp Alger and Chickamauga be of common occurrence in our military operations. In all matters pertaining to the health of the troops the medical staff of an army should be authority and in all councils of war their voice should be of equal authority with those of the combatant officers. If, as a great warrior declared, "Providence is on the side of the heaviest battalions," then, other things being equal, success will attend that army whose officers keep the greatest number of fighting men in available condition.

What but the skill of the medical officers of our army made the recent occupation of Cuba by our forces possible without frightful loss of life? What but their knowledge of the mysteries of the transmission of the plasmodium malariae and the yellow fever micro-organism by mosquitoes revealed to us by the Italian scientists and by Ross and Finlay, and of all the details of the methods of combating those pests acquired in Havana by Major Gorgas and his associates, has enabled us to carry on the stupendous enterprise of the construction of the great waterway by which is to be consummated the union of the Atlantic and the Pacific, and which has converted the Canal Zone from a valley of death into a region in which men can live and labor in health, safety and happiness?

Let me not be criticised as dwelling unnecessarily on the subject of military hygiene. The Army and Navy are an essential part of the body politic and what concerns their success concerns the welfare of the nation; but, apart from that fundamental fact, the problems of military and naval hygiene are not only akin to those of civil hygiene, but are often presented in a more concrete form which makes them easier to grasp. Especially is this so with regard to that last suggested. Just as it is the part of wisdom in a general to be guided in all matters pertaining to the health and vigor of his forces by the advice of his medical staff, so it is the part of wisdom in our lawmakers, when called on to legislate on subjects involving questions of health, hygiene or medicine, to consult scientific medical men, men who have devoted their lives faithfully and conscientiously to the study of these matters, rather than to lend an ear to the opinions of men learned in the law, perhaps, but entirely destitute of scientific knowledge, or to the vagaries of quacks and visionaries.

It is a frequent remark that in a representative government health laws can not go far in advance of the intelligence of the people, all of whom, illiterate as well as educated, foolish as well as wise, have the right of suffrage.

And, unfortunately, pseudo-scientists and acute legal gentlemen who are ready, for a consideration, to undertake to prove the worse the better cause on any medical or scientific subject no matter how profound, swarm in every lobby. For such pernicious intermeddlers and busybodies, the proverb of the old Romans,,"Ne sutor ultra crepidam," "Let the cobbler stick to his last," would be an effective argument, if any argument could avail against such brazen effrontery. Modesty as a point of attack being barred, is not the suggestion worth consideration that the scientific men who in one way or another occupy official positions in connection with a State government should regularly and as a matter of course be called on for advice in the advice in the decision of all questions involving scientific knowledge and training?

Let us give our legislators credit for, in the main, honestly striving to arrive at just conclusions on such questions. How are they to distinguish with any certainty between the false advisers and the true? How judge between the honorable men of science whose only goal is the truth and who seek to promote the public welfare, and the selfish pretender whose end and aim is to fill his pockets from the public purse, or the wild visionary who, deluded by some ignis fatuus of his own imagination, seeks to delude others? How, unless the government formally calls on the scientific thoroughly educated medical and sanitary experts connected with her various services and departments to consider questions of this kind coming before Congress and to advise as to their solution in the interest of the nation's welfare, giving their reasons for such advice? If a provision of this kind were satisfactorily established in connection with the national legislature, the states would not be long in following the example thus set. Still better would be the proposition to establish a Department of Health, with a Secretary of Health at its head, who should have a seat with the Persident's advisors, and who would make it one of his urgent duties to keep legislation of this character under close scrutiny, and to see to it that no member voted wrongly for lack of accurate information and definite explanation as to the merits of a question. The fact that medicine has become a great science and that preventive medicine is one of its most important branches imposes on the government the solemn duty of exercising a wise care for the health of the people.

This will still leave open a great opportunity in this direction for the educated and public-spirited physician; for the intelligence and knowledge of the masses in regard to such matters depend not only or mainly on the little smattering of sanitary knowledge acquired at school in early life, but on the frequent, intelligent imparting of such knowledge of the medical man to his patients. By the sick bed, at the fire side, in the social circle, the physician has constant opportunities of conveying valuable and much needed instruction and of combating the erroneous teaching of fanatics and charlatans.

An Intelligent Compliance with Legal Requirements the Keynote of State Medicine.

Let it be understood at the outset, however, that, no matter how great efforts we may make to educate the people, unless we have the *lex scripta*, the written law, to fall back on, state medicine, while it may be a beutiful science, can never be a practical art. The limitations of human nature forbid. Under the stress of agonizing illness or in the paralyzing presence of a great epidemic people will be impressed for the moment with the necessity for sanitary restrictions and submit to them with tolerably good grace, but the moment the pressure of fear is lifted from their hearts, self-love resumes its supreme sway. We are reminded of the legendary episode in the history of the Great Adversary in which it is recorded that:

When the Devil was sick,
  The Devil a monk would be;
But when the Devil got well,
  The Devil a monk was he.

No, we must trust to no such temporary amendments or death-bed repentances, but must fairly and squarely recognize the fact that, during conditions of ordinarily good public health, the great majority of mankind are neither wise enough voluntarily to submit themesives to the requirements of sanitary law for the sake of preserving their own health and those of their loved ones, or righteous enough to be willing to exercise self-denial and repress the craving of avarice to save others from sickness, suffering and death. It is gratifying to be able to record the fact that we have a conspicuous example to the contrary in the Chief Magistrate of our State who has recently cheerfully submitted to all the irksome requirements of domiciliary quarantine in order that the microorganisms that produce disease might not invade other homes outside the portals of the Executive Mansion. His example will do much in this as it has in many other ways to aid in the enforcement of righteous laws.

These laws must reach into all the relations of human life. As their basis they must start with the prompt and accurate registration of births, deaths and marriages, and of the presence of transmissible and communicable diseases, and they must embrace the control of epidemics by domiciliary quarantine; the employment of prophylactics and disinfectants the supervision of the transportation both of the quick and the dead; the construction, heating and ventilation of our homes and public buildings; the protection of water supplies and the restoration to purity of our polluted streams and lakes; the manifold occupations and industries of the people; the protection of food stuffs, including milk and other beverages, and of drugs, from adulteration and impurity; the education of physicians, dentists and veterinarians, and the barring of our doors against the introduction of communicable diseases and pestilences from foreign countries.

To accomplish these manifold and diversified ends, certain of these subjects, such, for example, as the prevention of the pollution of interstate rivers and streams, the prohibition of food adulteration and the sanitation of public conveyances on interstate lines of travel both by land and water, must be controlled by federal law. Other subjects, such as the problems of rural and school sanitation and protection of state waters, must be regulated by State law, and still others, such as the sanitation of streets and sewers, and the disposal of garbage, by municipal ordinances, each occupying its own legitimate sphere, all working together harmoniously for the common good of the nation.

The American Race Must be Protected.

Only by the enactment of judicious legislation of this kind, and its rigid enforcement when enacted, can we hope to perpetuate a vigorous race of American parentage on this North American continent, a race fired by the lofty ideals of our ancestors and nurtured in their traditions. Consider for a moment what manner of men they were and their object in seeking these shores:

Of whatever faith—Pilgrim or Quaker, Huguenot or Catholic—they came here for their faith and with the highest standards of right and righteousness; they were, moreover, men of good social standing in their own lands. In the face of the direst ills, and with the highest courage, they conquered these inhospital shores and made of this land the granary of the world and, delving into its bowels, unearthed its hidden mineral wealth.

Contrast this type of men with those who form the constantly swelling tide of immigration which, attracted by the success of our efforts, is now sweeping in, actuated by no higher motive than the accumulation of wealth, bearing on its bosom the ignorance, the vices, the follies and the pernicious political heresies of the lowest and most dangerous stratum of European society.

The Lesson of Husbandry.

In order to build up a race fitted to cope with these dangerous masses, we must combat the seeds which destroy the physiologic condition of the animal body in the same manner that mankind has always combated the seeds that destroy vegetable life. This latter warfare the human race has always acknowledged as possible and necessary for the preservation of the useful members of the vegetable kingdom.

The wise husbandman profits by the latest discoveries of science, as revealed to him in the bulletins of our national and State agricultural departments in order to determine the nature of the blight that is falling on his crops. He seeks the diagnosis of the disease that is attacking his trees, and seeks it from the men who, having patiently acquired an education in science as applied to the study of the pathology of plant life, have devoted their lives to making further discoveries in this domain.

If he finds his cornfield invaded by that troublesome creeping weed, the Canada thistle, he attacks it with the cultivator, the mattock and the hoe. If the San José or the oyster scale is ruining his orchard he sprays them with boiled lime and sulphur wash. If the tussock-moth is robbing him of his shade, he drenches his trees with solution of arsenite of lead, and if the potato bug is making inroads on the solonaceae in the vegetable garden he attacks the beetle with Paris green. In each case he searches out the cause of the failing health of the vegetable organism and uses the means for the removal or destruction of that cause which science has taught him will be most efficacious, and he does this with reasonable assurance that health will be restored and life saved.

He knows better than to apply to a lawyer, a cobbler or a tailor for this life-saving knowledge. And yet when the life and health of the animal organism in the form of their loved ones are in peril thousands of otherwise intelligent people in our land scorn the advice of the educated scientific physician and throw to the winds the means and appliances which science has taught may be of service in combating disease, pinning their faith rather to the butcher, the baker, the candlestick maker, or to any nostrum seller, impudent charlatan or miracle monger who pretends to powers of healing. Wherein lies this curious difference between the diseases of vegetable life and those of animal life that in one the teachings of science must be followed and in the other set aside

Antivaccination.

A still more reprehensible neglect to use the means which experience has placed in our hands for fighting disease is found in the case of the antivaccinationists. These misinformed people do not confine themselves to simple neglect of means, but set themselves in direct opposition to the requirements of State medicine having for their object the dstruction of the contagion of the most devastating pestilence the world has over known. It will require persistent vigilance on the part of the members of our profession who know the horrors of that disease to maintain this bulwark against its ravages.

Antivivisection.

Another class of well-meaning but misguided persons who plant themselves directly in the way of advance in medical science are known as antivivisectionists. These kind-hearted sentimentalists would permit thousands of children to die rather than a few dogs should suffer. If a foreign foe should attack our shores, they would send legions of our noble youth out to bleed, suffer and die in order to protect their homes and their possessions. They do not hesitate to make this supreme sacrifice on the altar of so-called patriotism. But if a physician, inspired with an earnest desire to provide a new means for the prevention of human suffering and death, makes an experiment on a dog or a guinea-pig, taking every possible precaution to minimize the pain to the animal, these tender-hearted persons hold up their hands in holy horror.

They do not pause to consider that diphtheria is a more relentless foe than ever carried a rifle or wielded a sword, and that but for experiments on horses tens of thousands of persons would now be sleeping in early graves who are today walking the face of God's earth rejoicing in the possession of health and happiness. They do not ponder on the agonizing convulsions which terminate the lives of those bitten by mad dogs, and from which so many have been saved as a result of comparatively trifling suffering inflicted on a few animals. The founder of Christianity pronounced that a human life was of more value than those of many sparrows. It is the Hindu who considers the sparrow more valuable than the man. Anyone who is on the ground during the session of a State Legislature can not but be struck with the amount of crude, ill-digested and even nefarious legislation falsely labeled "For the Better Protection of the Public Health" which is presented, and with the necessity for having intelligent medical men on the spot who can watch purely commercial schemes presented under the guise of sanitation and science and inform the legislatures of their true character.

An intelligent and conscientious chief executive is often our only bulwark against disaster of this kind.

Recent Sanitary Legislation in Pennsylvania.

Allusion was made at the opening of this address to comparatively recent legislation in Pennsylvania which has opened the way for unusual advances in sanitary administration. It will not be in appropriate, therefore, to refer to this body of legislation somewhat in detail. The first is the substitution, in place of a State Board of Health, of a Department of Health with a single official at its head, under the title of Commissioner, such official having a seat in the Governor's cabinet. The increase in effectiveness due to concentration of authority, coupled with absolute power of initiative, can readily be understood. In only two states and one district had this form of administration been adopted previously, namely, New York, Texas and the District of Columbia, and with very satisfactory results.

The addition of an advisory board whose principal specified duty consists in the preparation and approval of regulations in no way limits the executive powers of the commissioner.

The commissioner appoints all assistant and employees, assigning their appropriate powers and duties. He may issue subpoenas to secure the attendance of witnesses and to compel them to testify. He may issue warrants to any sheriff, constable or policeman to apprehend and to arrest such persons as disobey the quarantine orders or regulations of the department.

Purity of State Waters.

Secondly, the same legislature which established the department and gave the commissioner such broad powers also placed directly and specifically under his charge all the waters of the State and laid on him the formidable duty of reclaiming them from pollution in an "Act to Preserve the Purity of the Waters of the State." Under the provisions of this act no new system of water works for the supply of water to the public, and no addition to a system already existing, and no new sewage system or addition to a sewage system already existing may be made without a permit from the commissioner, in whose office must be filed certified copies of the plans, surveys and descriptions of such systems.

When an application is received for the introduction or extension of a water works system, whether by a company or municipality, the plans submitted are carefully gone over by the bureau officers in the engineering division, and, after they have familiarized themselves with them, the field officers receive their instructions from the chief engineer for a careful survey of the whole water shed from which it is designed to draw the supply. This report is returned to the chief engineer, who, in turn, submits the same with his comments and suggestions to the commissioner. The officers of the municipality or directors of the company are then requested to meet the commissioner in consultation and the whole subject is thoroughly discussed, after which a decision is rendered. A board, consisting of the Governor of the State, the Attorney-general and the Commissioner of Health, is charged with the duty of deciding whether or not the general health of the public would be subserved by granting a request permitting the sewage from any system otherwise prohibited to be discharged into any of the waters of the State, and on such unanimous decision is based the issuance of a permit by the Commissioner.

When it is called to mind that the area of the State is about 45,000 square miles, that it abounds in water courses, most of them available as sources of power, that it contains 29 cities, 883 incorporated boroughs and 1,520 townships, with a population of nearly 8,000,000, that under the lax system of legal supervision of sewerage heretofore prevailing in the State all of these centers of population and all of its manifold manufacturies and industries, with comparatively few exceptions, have been for years pouring their filth into the streams, nearly all of which are utilized as water supplies, it will be understood, first, how dire was the necessity for the passage of these laws, and, secondly, how immense is the task thus imposed on the department and what a storm of opposition it must have aroused.

Nothwithstanding these untoward conditions, tangible results are already being obtained.

Vital Statistics.

In the third place, Pennsylvania was up to that time without a State system of registration of vital statistics. Its Central Bureau of Vital Statistics possessed little more than a paper existence. Outside of the cities and large boroughs, no record was made of the birth or death of a human being, although associations interested in live stock made it their duty to preserve careful histories of the births and deaths of blooded animals. No death certificates being required before burial, the doors stood wide open for grave yard insurance and the concealment of death by violence or poison. The same legislature, however, removed this blot from the escutcheon of the State by passing an "Act for the Immediate Registration of Births and Deaths." In order to make this law effective in the rural districts it became necessary to appoint nearly a thousand local registrars and two hundred subregistrars. This was accomplished before then end of the year, so that January 1, 1906, found the machinery complete, and in six months from that time Pennsylvania was admitted to the list of registration states by the United States Census Bureau.

During the year ending December 31, 1906, 171,713 births and 122,484 deaths were reported, and the report indexed and bound for permanent future reference.

Morbidity Reports.

While vital statistics, however, are essential as the basis of all health work, they do not furnish the information needful to enable a department or a board of health to do prompt executive work in repressing the spread of communicable diseases. For this object morbidity reports of that class of diseases are necessary, and those can only be satisfactorily collected through physicians themselves. For this purpose postal cards are distributed to all the physicians practicing in rural districts, approximating 8,000 in number, and the law requires that these be promptly used and returned to the appropriate authority. These cards contain on the left hand margin a list of reportable diseases and on the remainder of the face blanks for the various items of information desired. In view of our greatly increased knowledge of communicable diseases and the means for their prevention recently acquired it was deemed desirable to increase greatly the list of diseases to be reported.

Including the returns from cities and boroughs, the entire number of cases of communicable diseases reported during the first year was 87,752. By this method we have been able, so to speak, to keep our finger on the pulse of the State to its remotest corner; and one of the most gratifying experiences in connection with the official work has been the hearty and prompt response which physicians have made to this new and somewhat unusual demand on their time and attention. When it is remembered that, in order properly to fill out one of the postal card reports it is necessary to make fourteen distinct entries in addition to date and signature, it will be recognized that the busy practitioner, probably already exhausted with his day's work is displaying commendable public spirit when he completely complies with this requirement. It should not, however, have caused surprise in view of our knowledge of the thoroughly altruistic spirit which characterizes the profession.

The value of the aid thus rendered the department in its efforts to prevent the spread of such diseases can not be over-estimated.

Free Antitoxin.

One of the first important pieces of information gleaned by the Department from its morbidity reports was the extreme prevalence and fatal character of diphtheria in the State, and we soon felt a concern, as our Quaker ancestors would have said, for the young lives which were being so wastefully and so needlessly, as it seemed to us, sacrificed. We knew that many of them could be saved if their parents were able to provide the physicians with antitoxin. From this conviction it was but a step to the belief that it was the duty of the State to furnish it.

To do so with any hope of success it was evident that this remedy must be placed within easy reach of the individual case, inasmuch as promptness in administration is the secret of success. An immense number of depots had to be established and stocked, and the physicians notified of the location of these stations. Reliable men had to be secured as distributors and instructed in the method of distribution. This labor occupied about three months, and the system was inaugurated Nov. 4, 1905. Any respectable physician can obtain the antitoxin, in a sterilized glass syringe with accompanying sterile needle, simply by pledging himself to fill up the blank clinical report, which is contained in the package, and returning it to the Department at the termination of the case. He must, of course, assure the distributor that the family is in indigent circumstances and that the product will not be sold.

From November 1, 1905, up to December 31, 1911, the number of cases treated has been 35,618 and the number of deaths 3,024, or 8.49 per cent. The number of exposed persons who have received immunizing injections has been 26,807. The number of those who have contracted the disease after attempted immunization has been 455, of whom only 22 have died. It is, of course, quite impossible to estimate how many of the immunized would otherwise have contracted the disease with fatal results. This, of course, would have raised considerably the ratio of lives saved. A liberal calculation shows, that, on the average, each life saved cost the State a little over $6. The number of stations at present is 510. The clinical reports must, after a time, furnish data of immense value for the study of this method of treatment of diphtheria. A careful analysis of them is now being made from all the various standpoints. From the point of view of the prevention of the spread of this fatal disease, leaving out of the question the saving of life and preventing of suffering, I can conceive of no more legitimate expenditure of the public funds or one which is more richly remunerative. ,

Routine Rural Sanitary Administration.

But, to return to the subject of sanitary administration, morbidity reports, affording definite and prompt information of the presence of communicable diseases in particular localities, are of little immediate practical use unless we possess the machinery for repressing these outbreaks; and reports of nuisances causing pollution of streams have little value unless we have a force by whom these nuisances may be abated. This machinery the Department has created by the appointment of local health officers, preferably not medical practitioners, in the rural districts, responsible directly to the Department of Health and dependent on it for their remuneration. There are about 700 such State officers supervised in their work by the sixty-six county medical inspectors.

Division of Medical Inspection.

The morbidity cards, together with the routine correspondence from county medical inspectors, boards of health, health officers or physcians or others, calling attention to the prevalence of communicable diseases at any particular point, or of disease breeding nuisances, are first received by the chief medical inspector or one of his assistants. The morbidity reports are usually the first and most reliable indications of an incipient epidemic. Unless the circumstances are of an unusual character, they are at once replied to, and the necessary instructions are issued from the medical division. When some unusual problem presents itself or some unusual exercise of authority is necessary, the question is referred to the Commissioner.

County Medical Inspector.

The relationship of the county medical inspector of the Department is that of a consultant, to be called on to diagnose doubtful cases, to investigate epidemics and to order such enforcement of the regulations as he may consider necessary to protect the public health.

The State Health Officers.

The relation of the State Health officer to the Department is that of a sanitary agent whose duties are to placard premises where communicable diseases have been reported by a physician; to establish quarantine in manner and form prescribed by the regulations of the Department; to furnish the householder with circulars governing the care of the special disease reported; to disinfect, to raise quarantine and to remove placards when instructed by the county medical inspector; to report to the Department any alleged nuisances, to make sanitary inspections, arrest offenders against the sanitary laws and regulations and order abatement of nuisances.

The advantage in rural districts, where the people are little accustomed to restraint, of having local health officers directly responsible to the State, rather than to local authorities, can not be overestimated. The State badge carries a weight of authority not conveyed by that of a township constable, and the officers does not hesitate to perform his duties because of the fear of incurring the animosity of his neighbors and so losing his place. On the contrary, he knows that only by the utmost firmness and faithfulness in enforcing the State laws and the regulations of the Department can he hope to retain his position.

Cities and boroughs having their own health authorities are, of course, not directly subject to the authority of the Department, except in the matter of reporting: but if the Commissioner finds that in any municipality the sanitary administration is so faulty that the health of the surrounding districts or of other municipalities is menaced he is authorized to step in and to assume entire control.

Thus we have a State system of sanitary administration complete and symmetrical, its head at the seat of power in the State, untrammeled in the exercise of authority, reaching down through the subdivisions of county and township to the people; and a department in daily touch with every nook and corner of the State through its faithful allies, the physicians of the Commonwealth. If it fails to accomplish great things for the health and happiness of the people, it will be the fault, not of the system, but of incompetence in its administration.

The Anti-Tuberculosis Campaign.

The present plan of the State Government Anti-Tuberculosis work may be summarized under the following headings:

First—The collection and tabulation of statistics relating to tuberculosis through official morbidity and mortality reports of each individual case.

Second—The establishment of sanatoria for the treatment of incipent cases, including infirmaries for advanced and hopeless cases.

Third—The establishment in each county of one or more dispensaries for the care of cases which cannot avail themselves of sanatorium treatment, including home visitations, and the study of occupational and social conditions.

Fourth—The maintenance of pathological laboratories for the examination of sputum and tuberculous lesions and biological laboratories for the development of immunitive and curative products.

Fifth—The restriction of tuberculosis by the disinfection of rooms, buildings (private and public) conveyances and common carriers, and by supervision and regulation over the general avenues of infection.

Sixth—The dissemmination of knowledge relative to the communicability, care and prevention of tuberculosis.

Up to June 1, 1911, 5,531 patients had been admitted to the South Mountain Sanatorium near Mont Alto. The present capacity is 850. During the spring of 1910 ground was broken for a second sanatorium on the beautiful tract of land at Cresson on the top of the Allegheny mountains, which Mr. Andrew Carnegie so generously gave the Commonwealth for the purpose. Ground has also been purchased for the erection of a sanatorium at Hamburg among the beautiful hills of Berks county, which will be easy of access for the teeming population of Philadelphia and the eastern counties.

Pennsylvania may well feel proud of the work it is accomplishing through its one hundred and fifteen tuberculosis dispensaries. Up to December 31, 1911, 45,993 indigent tuberculosis sufferers had received medical aid and the attention of trained nurses which these dispensaries provide. The dispensary nurses are required to visit the homes of the patients and advise as to the methods of personal hygiene and home sanitation. Prof. F. Egger, delegate from the Federal Council of Switzerland to the International Congress on Tuberculosis at Washington, in his official report, speaks thus of this branch of the work of the Department:

"Instructive as it would be to become acquainted with the excellent regulations of the States of Maryland, Massachusettes and others, we must content ourselves with sketching the measures adopted by Pennsylvania, partly as we observed them personally and partly as they were presented in an admirable collective exhibit accompanied by a catalogue full of reliable information." After giving a full description of the Mont Alto Sanatorium and an account of several of the dispensaries he concludes: "If I have taken pains to depict the noble undertaking of America in the field of the contest against tuberculosis this has been done not only in candid admiration and recognition of their achievement, but also with the object of showing our country what the spirit of energy and self-sacrifice can accomplish."

P416h

STATE AND UNIVERSITY LIBRARY
JUN 4 1912

Pennsylvania Health Bulletin

No. 30. HARRISBURG, PA. DECEMBER, 1911.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

EXPERIMENTS TENDING TO SHOW THE INFREQUENCY OF THE OCCURRENCE OF TUBERCLE BACILLI IN THE URINE OF PATIENTS SUFFERING FROM PULMONARY TUBERCULOSIS.

DEPARTMENT OF HEALTH LABORATORIES.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 30. HARRISBURG, PA. DECEMBER, 1911.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from Pulmonary Tuberculosis.

It suggested itself to me while making routine bacteriological examinations of urine and sputum in the Laboratories of the Pennsylvania Department of Health, that it might be interesting to determine in what percentage of cases of Phthsis Pulmonalis, tubercle bacilli occur in the urine of these same cases.

The line of investigation pursued led me to divide these cases into four groups: First, the occurrence of the micro-organisms in the urine alone; Second, their occurrence in both sputum and urine; Third and Fourth their absence in both sputum and urine.

The sputum and urine from 100 cases diagnosed as pulmonary tuberculosis by competent physicians of large experience in the diagnosis of pulmonary diseases, at the two Philadelphia Dispensaries for the treatment of tuberculosis maintained by the Pennsylvania Department of Health, and at the Dispensary of the Rush Hospital for Consumptives, constitute the series upon which I have based this report.

The method followed for the determination of the presence of the tubercle bacillus in the urine was this:

The specimen was centrifugated until as much of the solid matter as possible was thrown down, the supernatant fluid then being poured off, the sediment, after the manner of E. Trevethick, of London, (See Brit. Med. Jour. 1904 V. I. p. 13) was washed in sterile distilled water and centrifugated again, in order to dissolve the mucous and urinary salts which very often are apt to obscure the presence of the bacillus. This centrifugation, pouring off the supernatant fluid, and washing of the sediment was twice repeated.

The sediment was then spread over the surface of the clean slides and allowed to dry in the air. After fixation by heat, they were stained for ten minutes in hot Ziehl-Nielson Carbol-fuchsin, the superflous stain drained off and *one* slide was immersed in a saturated solution of methylene blue in absolute alcohol, the other in Pappenheim's solution over night for the purpose of decolorization and counterstaining.

The slides were then washed in water, dried and examined under the oil immersion lens.

There are three species of bacteria of the acid-fast type rather frequently found in the sputum and urine, from which it is advisable to differentiate the tubercle bacillus. These are the timothy or hay bacillus, the butter bacillus and the smegma bacillus.

The timothy bacillus is a good deal larger than the tubercule bacillus and frequently shows branched forms. The alcohol resisting power of the previously stained organism is also much less than that of the B. tuberculosis, and the likelihood of its presence is much less in urine than in sputum.

The bacillus butyricus or butter bacillus isolated from butter and milk by Petri, Rabinovitsch, Korn and others, possesses only the slight degree of acid-fastness and is therefore easily differentiated by the use of Pappenheim's rosalic acid-alcohol solution.

The smegma bacillus is the one which gives us most concern in its differentiation from B. tuberculosis in the examination of urine sediments.

Bunge and Trautenroth recommend decolorization with 5% chromic acid for fifteen minutes, sulphuric acid 16% for three minutes and a concentrated alcoholic solution of methylene blue for five minutes, for differentiation.

Coles, in the Journal of State Medicine, 1904 (p. 212) states that Smegma bacilli resist Pappenheim's solution for four hours tubercle bacilli for twenty-four hours and all other acid-alcohol fast bacilli for only two hours.

Francis Carter Wood of Columbia University, highly recommends Pappenheim's solution for differentiation of B. smegmae and B. tuberculosis. His method is to pour the Pappenheim's on the stained slide, drain off slowly and repeat five times.

Many authors consider absolute alcohol sufficient in itself as a decolorizer and agent in differentiation.

In our hands it has worked quite as satisfactorily as Pappenheim's solution, inasmuch as the differentiation between B. smegma and B. tuberculosis depends more upon the lessened ability of the smegma bacillus to retain the carbol fuchsin stain in the presence of strong alcohol, rather than in the presence of acid.

The occurrence of B. leprae in the urine of tuberculous patients in this country is so improbablo that it was thought to be hardly worth while to mention it is an organism from which to differentiate the tubercle bacillus.

In a number of instances I allowed the centrifugated sediment of the specimen to be digested over night in the incubator with an equal volume of 0.6% solution of sodium carbonate. In the morning this was centrifugated, the overlying liquid poured off and an equal volume of sodium hydroxide (0.25% sol.) was mixed with the sediment and allowed to stand so for fifteen minutes. The process of centrifugation, decantation and washing of the sediment with distilled water three times was carried out, and the sediment spread on two slides, and stained as above described. Antiformin was also used as a digestant with a few specimens. I found, however, that no better results were given by digesting them than in control specimens which were centrifugated and simply washed several times with sterile distilled water.

Stürm, whose paper on "Tubercle Baccilli in the Blood and Urine" published in the Beiträge Zur Klinik der Tuberculose and abstracted in the Journal Am. Med. Ass'n. V. 58 p. 70, states that he found tubercle bacilli in 50% of the series of fifty cases of tuberculous men examined by him.

In my series of cases in which tubercle bacilli appeared in the urine alone, there were five.

The number in which they appeared in both sputum and urine was six. The organisms occurred in the sputum but not in the *urine* of forty-eight cases; and were present neither in the sputum nor in the urine of forty-one cases.

In summing up in order to compute the percentage of cases of pulmonary tuberculosis in which tubercle bacilli occurred in the urine, we must take into consideration only those wherein the organisms were found in the urine alone, and in both sputum and urine. This number was eleven. In other words, the result of the examination of the urines of 100 tuberculous individuals with active pulmonary lesions showed that in only eleven per cent. could tubercle bacilli be demonstrated in the urine.

We do not know whether Stürm's percentage of positive findings was arrived at only by examination of the stained preparation of the sediment under the microscope or whether inoculation of animals with some of the sediments in which tubercle bacilli could not be found by microscopic examination, was resorted to.

It seems very probable, however, that if animal inoculations with the sediments of urines in this series of cases, the stained preparations of which failed to reveal tubercle bacilli on microscopic examination, had been made, the percentage of positive results would have been somewhat higher.

Signed,

DIXON.
RUCKER.

P4164

UNIVERSITY LIBRARY
AUG 1912

Pennsylvania
Health Bulletin

No. 32. HARRISBURG, PA. FEBRUARY, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

INSECTS.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1912

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 32. HARRISBURG, PA. FEBRUARY, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

INSECTS.

The Common Forms in Relation to Public Health and Methods for Their Destruction.

The relationship of insect life to public health has been clearly demonstrated by the transmission of the virus or germ of diseases, such as malarial and yellow fever by the mosquito, of typhoid fever, tuberculosis and intestinal disorders of infants by the common house fly, and of the bubonic plague by the rat flea, of which there are five varieties, and the squirrel flea, of which there are several. There are numerous other insects which bear more or less direct relationship of a harmful character to the individual or to the individual's comfort or food, and it is necessary to be informed as to the most convenient methods for their destruction.

In order that we may intelligently apply remedies and preventive measures, certain factors are essential, such as the proper recognition and identification of the insect, a knowledge of its habitat and methods of reproduction, and the method by which it transmits disease to human beings, showing its immediate relationship to the public health and comfort. The mosquito takes the micro-organism into its stomach at the time of biting an individual already ill with the disase; from the stomach the protozoa pass into the salivary glands and are injected into the tissue of a new victim at the time of biting. Fleas, flies, ants and other insects spread the infectious agents in two ways, first, by mechanical conveyance of the bacteria on their external parts and, second, by feeding on organic matter contaminated by bacteria which live for variable periods of time in the gastro-intestinal tract of the insect and are then deposited alive and virulent on the food of its victims. It is also probable that bacteria on the external parts and in the dejecta after deposition on the skin at the time of biting may be rubbed into the wound, causing local and, in certain instances, general infection.

With few exceptions, all germicidal agents are also insecticides. The most notable exception to this is formaldehyde which, though one of our most potent germicides, has little or no effect upon insect life. It seems desirable without going into the minutiae of the field of remedies and preventives for insect depredations to give a few brief directions concerning a few of the insecticide agents which possess the widest range of usefulness and are attended with the greatest economy and ease of application as well as maximum results. They will be taken up in relation to the particular insect and the method of use outlined.

The use of sulphur is outlined in some detail on the last pages. Sulphur is a destructive agent for practically all insects.

THE MOSQUITO.

This insect family, Culicidae, has been fully considered in Bulletin 21 of the State Department of Health, Commonwealth of Pennsylvania, March 1911, but the following methods to prevent development in the various stages seem advisable to present in this Bulletin.

The campaign against mosquitoes should really be begun in Winter, as at this time the hibernating species are found in houses. Thorough screening of the house with netting or wire screens having 18 to 20 meshes to the inch will keep mosquitoes from getting indoors. Should mosquitoes get in through openings of doors and windows, or through imperfect screening or absence of screens, their numbers can be reduced or even done away with, by the use of a paddle made of an oblong sheet of wire gauze, tacked onto a strip of wood of suitable size to serve as a handle. In order to destroy them in the house, whether during the Winter or Summer, the mixture of carbolic acid crystals and gum camphor, the use of which is detailed under the subject of the House Fly will be found effectual. In large cellars there should be several portions prepared at the same time in order to secure equal distribution of the vapor and equal effect throughout the cellar. The smoke from smouldering pyrethrum paralyzes the insect but does not kill and as they are difficult to find, this is but a palliative measure.

The burning of jimson weed (stramonium) and saltpetre is recommended. The space to be rid of mosquitoes must be tightly closed so that no fumes can escape for two hours. Three parts of powdered jimson weed mixed with one part of saltpetre is spread in a layer one-half inch thick on a tin sufficiently large to hold all the mixture necessary, or several tins may be employed. The powder is then lighted in several places and the fumes will shortly penetrate the space, provided at least eight ounces of the mixture is used for 1,000 cubic feet of air space.

The mosquitoes found on the ceilings of bed-rooms in the evening may be quickly killed by means of a shallow tin cup or jelly-glass cover, nailed to the end of a stick and moistened inside with kerosene. This is placed under the mosquito which either falls into or flies against the oil and is killed.

Mosquitoes may be repelled by the burning of Chinese punk and by the less desirable application of equal parts of olive oil and oil of citronella to the face, hands and ankles every half hour or so. Carrying naphthaline or bar camphor in the pockets is also of some use in keeping mosquitoes off the person. In case one is bitten by mosquitoes the best antidote is the application of a diluted solution of ammonia water to the wound as soon after the bite as possible. However, the most satisfactory means of fighting these insects are those directed to the destruction of the larvae and abatement of the breeding places.

Since the mosquito does not fly more than one-half mile from its breeding-place and, apparently only rarely as far as this, it is possible for any locality to free itself by bringing about a crusade against the mosquito within its own territory and for one-half mile around the same.

Many, and sometimes all, of the most extensive mosquito breeding areas in or around cities and towns or in a given locality are so situated that in the course of local improvement they will be done away with through grading or drainage. In the meantime such places are a menace to health and a positive nuisance; hence every effort should be made to have them drained or filled in, as the condition may demand, as soon as possible. Should filling in be necessary, much can be accomplished by securing in one way or another the co-operation of all parties who have ashes or dirt to dispose of and diverting this material to the mosquito breeding areas which are to be filled in. When the filling in is started the material should be delivered so that the edge of the pool will be the first portion to disappear under the material. Further, material should be added in such a way that the entire pool will be obliterated in the shortest possible time, which means that the material is to be spread out, first, to a depth that will leave no chance for pools to form. Until such permanent abolition can be secured, kerosene (one ounce to every fifteen square feet of surface) should be applied. In this proportion all larvae and pupae will be effectually destroyed, with the additional advantage of killing the females when they alight to deposit eggs. Usually, an application should be made once each month, though under certain conditions, its more frequent use may be advisable. It is more evenly distributed if placed in the water a short distance from the shore line. Barrels for rain water, if not screened and the outlet is at the bottom, may also be treated with kerosene. All standing water should be similarly cared for.

In order to more completely do away with mosquito breeding the co-operation of every householder must be invited and tenants must be directed either to remove all standing water or to screen it so completely with cheese cloth or some other material that this will effectively keep mosquitoes from getting at the standing water.

THE COMMON FLY.

The House Fly (Musca domestica) has been fully considered in Bulletin 23 of the State Department of Health, Commonwealth of Pennsylvania, May 1911. The following methods to prevent development in the various stages and for the destruction of the fly itself seem advisable to present in this Bulletin.

The breeding places should be eliminated. The larvae or maggots should be destroyed and the fly should be excluded from the home and food and all those not excluded should be destroyed.

Horse manure bears nearly the same relation to the House Fly that stagnant water does to the mosquito. For this reason, it should be carefully collected in a common receptacle which should be carefully screened in order to prevent egg-laying. The same protection or destruction of all garbage, filth and decaying matter of any kind should be made.

Drains and alleyways should be kept clean and free from any of the materials in which flies breed. No privies or closets accessible to flies should be permitted or, if permitted, they should be screened. Fresh unslaked lime or, if not obtainable, kerosene should be sprinkled freely in the privy vaults. The excreta from persons suffering from intestinal disease should be carefully disinfected immediately on discharge from the body.

All garbage slops and waste should be kept carefully and tightly covered until removed and destroyed and when taken away the container should be cleaned immediately after the removal of the contents. The ground contiguous to such containers should be treated with either unslaked lime or kerosene.

Cuspidors, especially those filled with sawdust, are very insanitary. All those permitted to be used should contain a 5 per cent. solution of carbolic acid, should be cleaned every day, using one of the following disinfecting solutions: Add one-half ounce of chlorinated lime (chloride of lime or bleaching powder) to one gallon of water; or three teaspoonsful of creolin, or eight teaspoonsful of a solution of formaldehyde (at least 37½ per cent. of gas, in solution) to one pint of water. The solution of formaldehyde is preferred.

The importance of dead or decaying wood or trees has always been overlooked. Flies frequently breed in the crevices; any of the last three named solutions may be sprayed (by using a pump spray atomizer) into such openings.

Flies should never be allowed to settle on food of any kind. All kinds of food stuffs exposed for sale are potent sources of danger as they are likely to be contaminated by flies which have walked or fed on sputum expectorated on the sidewalk.

Great care should be taken to have all houses screened before the fly time arrives, screening to be maintained carefully until winter time. Persons ill with infantile paralysis, typhoid fever, scarlet fever, diphtheria, measles and tuberculosis should occupy screened rooms and flies found in the sick room should be immediately destroyed and never allowed to escape. Houses within flying distance of a railroad should be especially well protected as flies contaminated with excreta from passing trains may gain access to the kitchen or dining room.

All milk, especially the baby's milk, baby's bottle and baby's bed should receive the same care and attention.

Among the various methods suggested for the destruction of flies, the following will give maximum results:

A piece of wire gauze, eight inches long and five inches wide, tacked to a wooden handle about fourteen inches long, makes an effective beater for striking and killing.

Pyrethrum powder heated in a pan or on hot coals so that it smoulders but does not burn, will give off a dense white smoke that paralyzes but is otherwise harmless; one ounce to every 1,000 cubic feet of air space should be used and the flies promptly swept up and destroyed. The best results are obtained if the room is darkened, leaving only a ray of light to enter at the window shade, as under these conditions flies usually accumulate on the ceiling where the maximum effect of the smoke is felt.

A solution made by adding two teaspoonfuls of formaldehyde to a pint of water sweetened with sugar and placed in saucers throughout the house will destroy many flies.

Another excellent solution is prepared by adding one dram (one teaspoonful) of bichromate of potassium to two ounces of water; or if a larger quantity is desired, 1 oz to 1 pint of water, which has been sweetened with sugar. This placed in shallow dishes throughout the house will not harm children should they get hold of it. It is a cheap solution and may be obtained at any drug store.

Cobalt chloride in the strength of 1 dram to 6 ounces of sweetened water is just as effectual, is non-poisonous but is more expensive and much harder to obtain.

Another efficient method is by using a mixture of equal parts (by weight) of carbolic acid crystals and gum camphor. Liquify the carbolic acid crystals by gentle heat, break up the gum camphor into small pieces and pour the liquid acid slowly over the camphor. The acid will dissolve the camphor completely and the resulting liquid is permanent and only slightly violatile at ordinary temperatures. It volatilizes rapidly, however, in a shallow tin over the flame of an alchohol or other lamp and the vapor is death to flies. Three ounces will suffice for one thousand cubic feet in a tightly closed room and it will require about half an hour to evaporate that amount. The vapor is not poisonous to man and is not destructive to materials or fabrics. It is not explosive but is inflammable and should be used with that fact in mind.

THINGS TO BE REMEMBERED FOR THE PREVENTION OF FLIES.

First: Flies can only breed in filth of the kinds mentioned and their presence is evidence that such material is at hand.

Second: They carry the cause of disease on their hairy bodies and legs.

Third: Keep them away from the sick, particularly those suffering with a communicable disease.

Fourth: Do not allow them to settle on the mouth, eyes, ears or nostrils of infants.

Fifth: Do not permit them to come in contact with food of any kind or to settle on the milk bottles of infants.

Sixth: Open privy wells or cesspools are particularly dangerous. Sanitary closets should be used.

Seventh: Uncovered or unscreened garbage cans and open drains should not be permitted.

Eighth: Physicians should see that the excreta of all persons ill with intestinal disease are disinfected and cared for in accordance with the regulations of this Department.

Ninth: Manure should be collected twice a week and spread on the fields and composted or stored in fly-proof receptacles.

FLEAS.

These insects, whose zoological classification has placed them among the Siphonaptera, number in kind over one hundred, all of which live on mammals and birds. The importance in transmitting disease has been recently demonstrated in the studies of bubonic plague in California and Washington. This disease appeared in 1900 causing 113 deaths in 119 cases; in 1907-1908 there were 77 deaths in 159 cases. The common means of transmission was found to be by means of rats, mice and squirrels of all species, and the medium between these affected animals and human beings was a species of flea, the Pulex fasciatus, also called lamlaemopsylla chocops.

The flea is a wingless, parasitic insect having a laterally compressed body of a dark reddish color and has legs arranged for leaping. It is provided with a puncturing and sucking apparatus with which it imbibes blood and lymph from its victims. It mostly infests warm blooded animals. It is a common opinion that each species of mammal has its own peculiar flea and while a great many different varieties have been described, some of which are peculiar to certain mammal forms, one species of flea may infest a great many different species of mammal, passing rapidly from one animal to another. The common forms which trouble American homes are the House Flea (Pulex Irritans), the Cat Flea (Pulex Felinis) and the Dog Flea (Pulex Canis).

Each female deposits from eight to twelve whitish ovoid eggs, the favored place being in dust or lint, under carpets and in the larger crevices of wood work. In Summer time the larvae issue in four to six days, passing into the pupal stage eleven days later and about twelve days later becomes adult fleas; hence the time for development is about four weeks and in the Winter usually averages about six weeks. As a rule four to six broods from each female are hatched out during each Summer season.

The House Flea, as indicated by its name, occurs particularly in human habitations, secreting themselves in bedding, clothing, carpets and window hangings, from which it attacks its human victim.

especally at night. It is distributed widely and sometimes becomes a serious pest even in spite of the most rigid cleanliness, well defined plagues having occurred especially in certain sections of Philadelphia. The Cat and Dog Flea rival the House Flea and though they adhere closely to their peculiar hosts, they are frequently as troublesome to human beings as is the House Flea.

Old floors, mattings and carpets favor their development as the young larvae easily penetrate the crevices and interstices where undisturbed development takes place. Places frequented by them should be thoroughly cleaned, using boiling hot water or dusting freely with Pyrethrum powder, especially in the crevices and openings where dust and dirt may be lodged. If desirable, a decoction made be made consisting of one ounce of Pyrethrum powder to one gallon of water, which is to be boiled for ten minutes, filtered or strained and the liquid sprayed into all infested places. In the adult stage they are more difficult to destroy even with the persistent use of Pyrethrum. If the latter fails, free sprinkling with benzine may be tried. This failing, it may be necessary to remove all carpets and hangings and scrub thoroughly with hot soap suds.

On animals they are readily stupified by dusting Pyrethrum powder into the hair. The fleas will fall off while stupified and should be *immediately* swept up and burned. Resting or sleeping places for infested animals should be carefully provided with straw matting or a piece of carpet, as it can be readily shaken into the open fire and the eggs, larvae and fleas with which it is usually covered, destroyed.

There is large difference in the liability of different individuals to the bites and marked variability in the results. One victim may totally escape, another have slight temporary discomfort, while others suffer severely. Scratching the bites with secondary infection of the wounds has caused serious consequences. The best antidote for a bite is some alkaline wash, as ammonia water; other lotions to relieve the local itching and distress may be used and to act as antiseptics to prevent secondary infection. Such lotions may be made up of a 5 per cent. solution of carbolic acid in water or the same solution containing menthol or a 5 per cent. solution of menthol in alcohol.

CAUTION: Benzine is highly inflammable.

COCKROACHES.

These insects, of the family Blattidae, number nearly a thousand in variety of species. Very few species, however, live in association with human beings. The common variety in Pennsylvania is the American roach (Periplaneta americana) and the "black beetle" (Blatta orientalis) which are common in many kitchens. It is uniformly of a dark brownish color, broad and flattened in shape, and hard and smooth to the touch. The young are much like the adults. The latter are hatched from eggs, which are contained in a horny capsule, deposited by the mother in the darkest places of concealment which can be found. On hatching, the young are often brooded by the parent during the earlier weeks of life. They pass through a variable number of molts before reaching the adult stage. The length of life is long, in some species is said to be four or five years. It is likely that not more than one brood is developed each season, and then only during the warm weather, as they are particularly sensitive to cold.

In houses, roaches are particularly abundant in pantries, kitchens and in the walls near stoves and fireplaces. They are often abundant in oven rooms of bakeries or wherever the temperature is maintained above normal. During the day they conceal themselves whereever protection from natural enemies and from light is afforded. Because of their shape, they can squeeze into very small crevices. When surprised, they seek shelter with a scurrying gait and usually escape capture or destruction.

They are practically omnivorous, feeding on dead animal matter, cereals and any form of food materials; they also eat woolens, leather, the cloth and leather bindings of books (because of the paste) and occassionally turn cannibal.

There is no evidence at the present time that they transmit disease, yet the soiling and rendering nauseous of everything with which they have contact makes their destruction a matter of public comfort. They give off a fetid, nauseous odor which persists after most persistent cleaning. Food supplies are tainted, shelves and dishes stained and the atmosphere made almost unbearable, which in part is from excreta but for the most part from an oily liquid secreted in the scent gland and a dark colored fluid from the mouth. They have a certain value as scavengers and in destroying bedbugs.

It is difficult to get rid of this pest. They have few natural enemies, an ichneumon fly and the tree frog being the only ones known.

They readily detect poisoned foods, avoiding arsenic and other common poisons. The smoke of pyrethrum powder (described under The House Fly) will paralyze but not kill them. Flowers of sulphur dusted along the baseboards repels them, as also does phosphorus. The latter of 1 to 2 per cent. strength made into a paste with sweetened flour will destroy many; to make the paste take one-fourth teaspoonful of phosphorus, two level tablespoonsful of flour, mix and make into a paste with well-sweetened water. The fumes of bisulphid of carbon in the proportion of one pound to 1,000 cubic feet of air space (if the room is sealed) will destroy every roach. As this is an explosive in the presence of fire, great precaution is necessary.

A food, prepared by taking one part of plaster of Paris and three or four parts of flour in one saucer with plenty of water in another saucer and bridged for easy access, makes a simple remedy. The insects readily eat the mixture and drink freely. The plaster sets and clogs the intestines. The dead bodies disappear, in all probability being eaten by the survivors. Finally, ingenious traps have been contrived, the simplest of which is the use of a quart fruit jar. The jar is partially filled with stale beer and inclined so that it is easy of access but prevents the roach from escaping. A rough stick leaned against the opening serves as a gang-plank. Once in the jar the insects perish or are easily destroyed.

CAUTION: Phosphorus is very inflammable and very poisonous.

THE BED-BUG.

(Acanthia Lectularia).

The bed-bug is a small but plainly visible ovoid shaped bug having a peculiarly disagreeable odor. It is of a reddish brown or rusty color, with some black coloration on the abdomen and is provided with a puncturing and sucking apparatus. The young is similar in all details to the adult. The eggs or nits are small white oval objects which are laid in batches of from 6 to 50 in cracks and crevices of furniture, walls or floors. There is an average hatch of several batches during each season and it takes from seven to eleven weeks for development from the egg to the adult stage. There is a wide variation in the egg laying and hatching, dependent on weather conditions, but it is customary to look for a new brood about every eleven weeks. However, it has no fixed period of the year for its development, generations succeeding one another as long as the temperature is sufficiently elevated. During cold weather the insect merely becomes stupefied. This hibernation occurs in different places of concealment where large numbers congregate until the return of warmer conditions.

It is peculiar to the habitations of man and is said not to trouble savage races, or rather it is supposed to be present when habitations have a certain degree of comfort and permanence. Nothing is really known as to the origin of this insect but it is very widely distributed. Other species of the same family are said to frequent birds, particularly the common chimney swallow, pigeons and bats and are very similar to the common bed-bug.

It is nocturnal in its habits, seekings its place of concealment during the day. It normally feeds on human blood but there is some evidence that it can feed on foods similar to those used by other insects. It thrives particularly well in filth and old houses and has been kept alive without food for one year.

It is said to be instrumental in transmitting certain contagious diseases and there is some evidence that small-pox has been so communicated. Drs. Smith and Dixon started investigations in the Laboratories of the State Department of Health of the Commonwealth of Pennsylvania in 1905 to determine whether or not bed-bugs transmitted small-pox. The results are not concluded at this writing. The possibility of conveying relapsing fever, typhoid fever and leprosy has been suggested and in the near future will likely be proven.

The bite is distinctly poisonous to many individuals, resulting in a local inflammatory reaction. This is not due to an especial poison but it is probably due to the same secretion which gives the characteristic odor.

On account of the places of concealment in the floors and walls the bed-bug is not reached by ordinary measures; on brass and iron bedsteads it is easy of access, while it is somewhat more difficult in old wooden bedsteads and at times it is impossible to destroy it or the eggs in the crevices of old walls and floors. In order to effectually get rid of this pest, it is necessary to establish a vigorous campaign with daily inspection and destruction of all of the eggs as well as the bugs which may be found.

For use on bedsteads and available crevices one of the best measures is hot water. The most practical way is to make liberal applications of benzine or kerosene, either used alone or to make up according to the following formula:

Oil of mirbane—one dram (or 1 teaspoonful).
Oil of turpentine—seven drams (or 7 teaspoonsful).
Benzine, add enough to make one pint.

This should be introduced into all crevices with feathers, small brushes or small spray syringe, as a rose brush syringe, which may be purchased at the seed store. A cheap atomizer gives very satisfactory results.

For use in mattresses and beds:

Bichloride of Mercury (corrosive sublimate) ½ oz.
Sodium Chlorid (common salt) ½ oz.
Formaldehyde, 4 oz.
Spirits of Turpentine, 6 oz.

CAUTION: These preparations are *poisonous* and *inflammable.* No open lights or flames should be permitted in the room.

Pyrethrum, either as powder or in decotion, is practically of no avail. It forms the basis of most of the patented bed-bug exterminators.

In rooms containing books or where liquid applications are inadvisable, a thorough disinfection with sulphur is an effective means of destruction, the method of which is described in detail on page 17.

HOUSE ANTS.

(Monomorium Pharaonis).

There are a number of species of ants which infests our homes but the chief offender is the small red ant which passes its entire existence in houses. The larvae and pupae (commonly called the "eggs") are minute, whitish, oval objects which are produced in enormous numbers by the solitary queen-mother. They are deposited in the walls or under the flooring only during the late spring and the summer months.

The ant is not inimical to health nor is there evidence that it acts as a host to transmit the cause of disease. It's chief claim for consideration and destruction is it's mere presence in articles of food, particularly sugar, preserves, and other sweets. When one ant has discovered such foods, the news is quickly spread and soon the supply is covered or filled with an entire colony.

In order to get rid of such invaders it is of first importance to keep food products in tight receptacles and to remove sugar and sweetmeats scattered by children. Several methods to destroy them have been suggested, and as temporary measures, when the nest cannot be located, the following may suffice:

Moisten a sponge with sweetened water; when filled with ants, drop into boiling water. Several of the traps may be prepared and enough time allowed to elapse for the ants to swarm into the openings.

An ingenious method has been described as follows: A groove large enough for the passage of a single ant, is made in an ordinary cork. The bottle is partly filled with sweetened water and a thread moistened in the preparation passes from the floor to the passage through the cork. When once the ant within the bottle is gorged with food, he cannot get out. Thousands may be trapped in this way.

However, the only thorough extermination is the destruction of the colony and its nest. There is no means of locating the latter, except by following the ants back to their point of disappearance. Bisulphid of carbon in liberal quantities (about two ounces) is then poured into the region of the nest. This substance is so penetrating that its work is thorough, if the nest is properly located.

The small black ant (Monomorium minutum) and the pavement ant (Tetramorium caespitum) sometimes become house nuisances, though the colonies are under stones, in the ground and under pavements. The latter are recognized by the small pyramids of grains of earth which surround the excavations. The destruction of the colonies by kerosene or carbon disulphid usually exterminates these species.

CAUTION. The fumes of bisulphid of carbon are explosive in the presence of any fire or open flame. Care should be taken that none are present where this chemical is used.

LICE.

The importance of this bug as a disease transmitter has been demonstrated in recent investigations of tabardillo, (Mexican typhus fever), which is also known as American typhus fever. In studying the identity of this disease with Brill's disease, it has been shown that "the body louse is probably the *usual* distributing agency" and the head louse is believed to be as active an agent.

These parasites belong to the class insecta, family Pediculidae, and pass the whole of their existence on the mammalian forms. Very few of the species are ever found upon other species of animal than that they normally infest. Those infesting man are approximately one-tenth of an inch in length and can be readily found on close observation of the scalp or clothing. They are rarely found on the uncovered skin. It should always be borne in mind that lice must grow from eggs laid by an adult louse and can never originate from filth or other matter. They hatch out within a week and the young are competent to reproduce in less than two weeks. A single adult female is capable of producing a progeny of 5,000 within eight weeks.

The annoyance and inconvenience of their presence may be the only ill result, but in many individuals this leads to sufficient nervous irritation as to cause ill health. Scratching with secondary infecton, especally in children of low physical resistance, has led to serious consequences. Such an occurrence in Pennsylvania on three members of one family led to a temporary diagnosis of smallpox, causing in addition to the illness, great social and domestic inconvenience, mental distress and loss of education.

While the symptoms caused by lice are to a great extent the same in the three varieties described below, they are somewhat multiplied by the locality invaded and hence the three types are best described separately:

HEAD LICE. (Pediculus Capiti).

These forms are grayish in color with blackish margins but after feeding may be of a slight or a decided reddish tinge, due to imbibed blood. The ova or "nits" are found attached to the hair shafts on the scalp at some distance from the head and are minute white or grayish pear-shaped bodies, visible to the naked eye.

TREATMENT. It is desirable to destroy both lice and nits in as short time as possible. For this reason the following is recommended. Wet the hair thoroughly with crude petroleum, which may be obtained at any drug store. Keep it wet for three hours, then wash the whole head with warm water and soap. Repeat this process on three successive days. The nits may then be removed by combing the hair very carefully with a fine tooth comb wet with vinegar. If there is no objection, treatment is made easier and more thorough by cutting the hair short. All persons in a family are likely to be afflicted hence every member should be treated as above. Brushes and combs should be cleansed (before and after using) by putting them in boiling water for a few minutes.

BODY LICE. (Pediculus vestimentorum).

This parasite belongs to the same family as head lice but it is somewhat larger and is found commonly on the body, where it goes for the purpose of feeding only. In the adult form it can be differentiated from the head lice by dark transverse bands across the back. Reproduction for the most part occurs in the various folds and seams of the clothing; however, it has been observed that some of the ova or nits are attached to the fine hairs (lanugo) of the body surface.

As the parasites live in concealed portions of the clothing and especially where the skin is most conveniently reached, the various lesions are to be found most often on those parts, such as around the neck, across the shoulders, the upper part of the back, around the waist and the outside of the thighs.

Treatment should be directed to the infested clothing where the parasite and nits are to be found. All garments should be thoroughly baked, boiled or gone over with a hot iron in order to destroy them. However, a general tub bath of corrosive sublimate is advisable because of the nits which are attached to the finer hairs; eight tablets of bichloride of mercury to a tub of water makes a strong enough solution for this purpose.

CRAB LICE. (Phthirius inguinalis).

These are a smaller species of the same family as head or body lice but are quite distinct on account of the shape, being nearly as wide as long. The strong legs, spread out laterally, give them the appearance of crabs. They are of whitish color, somewhat shaded on the shoulders and the legs are of slightly red tinge. Each is about one-tenth of an inch in length.

They are to be found on the various hairy regions of the body other than the scalp, but do not thrive among the fine hairs of the head, though they have often been observed in the eyebrows.

TREATMENT. Repeated washings with vinegar or diluted acetic acid will free the hairs of ova. This should be followed by careful daily shampoo of all the regions involved. After the shampoo a solution of corrosive sublimate containing one tablet to a pint of water should be freely applied. If not desirable to use the mercury wash, a lotion consisting of

Tincture of larkspur, ½ oz.
Commercial ether, 8 oz.

Or a stronger solution, consisting of equal parts of the two ingredients may be used, afterwards covering the parts with a closely applied dressing.

CAUTION. Corrosive sublimate (bichloride of mercury) is a powerful poison; ether is highly inflammable.

THE ITCH MITE.

Infection by this mite (which properly is not an insect) is so common that it is considered advisable to include it in this Bulletin.

The species of the mite which afflicts man (Sarcoptes scabei) is the minute bug which gives rise to the condition commonly known as "Itch," "Seven Year Itch," "Army Itch," "Jackson Itch" and many other synonymous names. So-called "Cuban Itch" is simply an army nickname for Small-pox. It has an oval body with marked spinus projections. The female is larger than the male and is 1-70 of an inch long by 1-50 of an inch wide. It is really the female alone which causes the phenomena which lead to its discovery; it burrows into the superficial skin forming a tortuous or, at time, a straight, dotted, slightly elevated line which varies in length from one-eighth to one-half inch. On close observation it will be seen that the burrow is dark gray or blackish in color, thread-like, and may be slightly more elevated at one end. It is in this that the eggs are deposited and the elevated end of the burrow usually contains the female, which in the vast majority of instances has already perished. As the mite extends its channel into deeper portions of the skin and as they hatch, the young feed upon the surrounding tissues; when fully grown they wander out and mate on the surface of the skin, after which the females begin a fresh burrow. The ova hatch out gradually, taking an average of five or six days to develop into the larval stage, and twelve to fourteen days longer to reach the adult stage.

It is commonly transmitted from one individual to another by occupancy, either of the same bed or of a bed on which the linens have not been changed. There is some reason to believe that it is transmitted by the use of the common towel and also by shaking hands. It is commonly found in the moist surfaces of the body, such as between the fingers, hands, folds of the wrist, in the folds under the shoulder, lower portion of the abdomen and about the neck. Its entire existence is spent on its human host. It is believed not to have any power to transmit disease but may be inimical to the health of the individual because of the secondary infection of the burrows caused by the mite and excoriations produced by scratching. In addition to the injuries produced by scratching there are varying degrees of papular to pustular lesions throughout the favored regions.

It is usually in insanitary conditions that mites are able better to thrive. In order to destroy them, it is necessary to have all bed linens and clothing used by an individual already infested thoroughly boiled or baked. If woolens are in use, they should be baked or thoroughly ironed with a hot iron. The patient should have a hot bath, rubbed down with a coarse wash cloth or brush which serves to open up the burrows and exposes the eggs for destruction. After the bath an ointment should be rubbed in, made up after the following formula:

Sublimed sulphur—one dram (1 teaspoonful).
Balsam of Peru—one dram (1 teaspoonful).
Vaseline—one ounce (2 tablespoonsful).

This should be repeated morning and evening for from two to four days. In particularly serious cases, it may be necessary to repeat this entire treatment at the end of one week.

SULPHUR DISINFECTION.

This agent is most useful for the destruction of insects and vermin, but when used for this purpose all rooms in the building should be disinfected simultaneously.

The room to be disinfected should be sealed with strips of gummed paper or strips of paper and home made flour paste, closing flues, chimney places and all visible cracks and crevices about the walls. Or the same openings should be stuffed with cotton by using a table knife.

Open up beds, stand mattresses on end, open closets, bureau drawers and trunks, spreading their contents about the room.

Fabrics, especially carpets, bed and body clothing fully unfolded, should be suspended upon chairs, clothes-lines and bedsteads, exposing all surfaces to the fumes of the gas.

Three pounds of flowers of sulphur should be used for every 1,000 cubic feet of air space.

Bricks should be placed on edge in the bottom of a metal tub containing 4 inches of water (dampness is necessary to render the fumes of sulphur effective).

An old iron kettle or other vessel into which the sulphur is to be placed should then be set on the bricks.

The sulphur in proper proportion is then ignited by lighting a small quantity of alcohol which is placed in the centre of the sulphur. A hasty exit should be made by the disinfector.

The door is then to be sealed on the outer side and the room should remain closed for a period of at least twenty-four hours.

The room should then be opened and if possible should be thoroughly aired for two days before it is again occupied.

CAUTION. It should be remembered that sulphur will tarnish metals and is injurious to the coloring matter and tensile strength of fabrics. Metal fixtures, which cannot be removed, may be covered with a protective coating of vaseline or lard.

P416h

STANFORD UNIVERSITY LIBRARY
AUG 1912

Pennsylvania Health Bulletin

No. 33. HARRISBURG, PA. March, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE OPPORTUNITIES FOR THE TRAINED NURSE IN SANITARY SERVICE.

An Address Delivered to the Graduating Class of Trained Nurses of the German Hospital, Philadelphia, Pa., March 12, 1912.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 33. HARRISBURG, PA. MARCH, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

THE OPPORTUNITIES FOR THE TRAINED NURSE IN SANITARY SERVICE.

An Address Delivered to the Graduating Class of Trained Nurses of the German Hospital, Philadelphia, Pa., March 12, 1912, by

SAMUEL G. DIXON, M. D., LL.D.

Today, after a thorough training in one of the greatest hospitals in our land, where you have been assisting the leading medical men and surgeons of this great medical center, you are entering upon the most useful field of professional work that women are ever called upon to perform. It is truly women's work. Nature has ordained that the female should be her nurse. Women's intuition to perceive the wants of the young or old is far more acute than that of the opposite sex.

You are, therefore, born to your profession. This fact of natural advantage, plus your excellent training in nursing, leaves you no excuse for not attaining the very highest proficiency in your profession. If a high goal is to be gained, you must realize that the fulness of the heart is in giving and not in taking. You must love your work; you must sacrifice yourselves daily; you must ever bear in mind that loyalty to the physician is loyalty to the patient. You should obey the physician's instruction most religiously and watch with intense interest the result of his treatment, let it be either medical or surgical.

The surgical work is particularly interesting because of its immediate result, but the modern biological products have given new life to therapeutics. How many times you can see them snatch life out of the very jaws of death. Through the power of viruses and antitoxins the germs of disease are prevented from living in the animal economy. By the use of biological products we may hope to relieve the surgeon's knife of some part of its work. I have heard leading surgeons say that certain of the biological products were now doing for them the work that for many years has been done with the knife. Advanced treatment and prevention by these products have given medicine its place in science. With the exception of Jenner's discovery of vaccine for smallpox, it was only yesterday, as it were, that we had no antitoxins and preventive viruses. In fact training schools for nurses only had their coming into this city when Alice Fisher, Mary Walker and Catherine Milnes established schools in connection with Philadelphia Hospitals.

A new day then dawned for the indigent sick in this great city; and from that day to this the work of the hospitals has been placed on a higher plane, until it has reached its present high standard of efficiency. This band of noble women gathered about them nurses who not only demonstrated the usefulness of trained women in medicine, but made us appreciate how comparatively helpless we were before skilled nursing became an important part of medicine and surgery.

From that day up to the present time we have continued training nurses to care for the sick. They have carried out the orders of the physicians in charge like true soldiers and it is impossible to estimate the amount of good that has been done by them. Possibly hospital training is up to par with medical knowledge and now can only forge ahead as the science of medicine advances. With trained nurses as with practitioners of medicine, a new day is at hand.

Just as we have passed the stage of training physicians to exert their greatest effort alone in curative medicine, so too have we reached the day in training nurses when a higher calling is at hand for those who have been thoroughly grounded in the fundamentals of the care of the sick. Just as the profession of medicine found that they needed the helping hand of women to save the lives of those ill with disease so does the worker in preventive medicine find that he needs the assistance of women in his campaign to prevent disease.

Public health work in recent years has become very much more than the mere enforcement of laws for the spread of communicable disease and the nursing of those who happen to be ill with contagious fevers. Today the greatest energies of a Health Department are exerted in protecting the public from preventable illness and in teaching and educating the public to a proper appreciation of the principles of preventive medicine. It is in this field of work that the trained nurse will find one of her greatest spheres of usefulness.

Health authorities may do a great deal in educating the reading public and may work out in great detail information of value in protecting the public, but it is to the trained nurse, with aptness for sociological work, that we must look for carrying the details of this teaching into the homes of the poor. It is the trained nurse with the proper appreciation of the cause of disease who can best go into the homes in times of illness from various communicable diseases, and who can at the same time that she is helping with the nursing, teach the principles of prevention. It is the trained nurse in her visit to the home of the poor who can do more than anyone else to educate the housewife in domestic hygiene. It is she who can impress the lessons of proper ventilation, rational feeding, due regard for rest and sleep and wholesome living, all of which help to build up a resistance to the causes of disease and lead to a stronger and more rational race of men and women. It is she who can go into the home of the poor and teach the expectant mother proper methods of care for herself and her unborn, can prepare her for the proper care of her infant before birth and immediately after birth, and the care of the infant's food supply. She can set a high moral standard which must in time have its influence upon the peace of the world.

It is the work of the intelligent trained nurse applied in a sociological way that will do more to save the lives of mothers and their infants than any other. It will be one of the greatest helps to the Health Officer in the work aimed at preventing tuberculosis, and the spread of typhoid fever and scarlet fever and the other communicable diseases.

The State Department of Health in this Commonwealth today has 110 trained nurses constantly teaching the families of the poor who are afflicted with tuberculosis. These women go into the homes of the poor, correct insanitary methods of living, instruct householders in the principles of ventilation and impress upon the housewife the importance of fresh air and wholesome food. These nurses in their work constantly meet with incipient cases of tuberculosis long before they would naturally come under the care of physicians, they bring them to the dispensaries, succeed in having medical advice given early and are thus saving many lives. This entrance of the trained nurse into the field of preventive medicine is but the beginning of what may be expected. Equally large fields are open to the *specially* trained nurse, and they have already entered them in some of our large cities, viz: saving the lives of infants by beginning the training with the mother, by helping in the care of the infant's eyes soon after birth; and by intelligent teaching of the care of the domestic milk supply. In the future I have no doubt that hundreds of nurses will be engaged in this phase of preventive medicine alone.

We have only begun to touch upon housing conditions among the poor. The trained woman can do better work probably in correcting the sins of bad housing than can the male worker in this field and so may she be equally useful in routine sanitary inspection. The chief difficulty of the problem today is that the physician and the nurse pay little or no attention to the general sanitary conditions of their patients' homes. The nurse, when her patient is convalescing has many opportunities to lead the members of the household into conversation on sanitary medicine.

Probably the time is near at hand when philanthropists may well consider the establishment of special training schools where the woman who has already been well grounded in the principles of nursing may take up this larger field of the nurse's work and prepare herself especially for these public duties. What could be more helpful in a great city like Philadelphia than to have a training school where those who wish to take up special work of this sort might go, when they had completed their course in a great hospital, and, at the end of hospital training, or later, prepare themselves for a career in sociological nursing. I say this advisedly because, from a large experience, I find that the woman so thoroughly trained in bedside work is not always best fitted for the kind of work health authorities require. Your clinical training is, however, essential for our best results.

In the year 1905, before the Pennsylvania State Department of Health was organized we found ourselves up against an epidemic of smallpox. Physicians and the trained nurses were like the regulars in our standing army,—they were all immune to the disease through vaccination and they fearlessly walked into the houses where this most loathsome of all diseases existed. It was different with the men we had to employ as guards to keep the convalescents in confinement. We had to hunt for vaccinated men in a community where by the law of the State all school children were to be vaccinated. Because of the ignorance of our people, and long continued immunity, the result of protection, vaccination had been neglected and the law had not been enforced. The result was that a large proportion of the grown-ups were not vaccinated. The ignorance of our people was largely the fault of our physicians but partly due to the nurses. They both had neglected to take advantage of their opportunities to teach their patients and particularly the mothers of the necessity and efficacy of the first and one of the greatest discoveries in medicine. Thirty years before we would not have experienced the same trouble. Then the babies represented the producers of the vaccine virus, as the scab of one infant was used to immunize others. The doctors, therefore, never dismissed a confinement case until they had either successfully vaccinated the baby or had attempted to persuade the mother to submit to the vaccination of her child. A new era came and vaccine was produced at our biological laboratories in a manner which relieved the virus from the possible dangers of the old method. The doctor, however, could purchase his virus whenever occasion arose. He soon became indifferent about vaccinating the babies particularly when he met with ignorant opposition from the parents and so we became a comparatively unvaccinated community—which cost the State many lives, much suffering and the disfigurement of many people, besides a direct loss of hundreds of thousands of dollars. The nurse who cared for the horrible cases of confluent smallpox during the epidemic lost few opportunities to teach the value of vaccination.

The next opportunity given to nurses to prove themselves Clara Bartons was the typhoid epidemic at Nanticoke, a mining town near Wilkes-Barre. Here the miners believed that God had sent typhoid to them as punishment for America's having permitted the sinking of the Russian war vessels. These Russians had simply given up any attempt to battle against disease. The State officers, with our Chief Nurse, soon arrived on the ground where they visited the squalid homes and cleaned things up and taught the well members of the family to care for the sick between their visits. This, however, did not prevent the rapid development of secondary cases. We soon realized the necessity of a hospital. Dr. Johnson, the Chief Medical Inspector and Miss O'Halloran, our Chief Nurse, appeared before the borough Council and the local Board of Health, and obtained their consent to turning the townhall into a hospital. So devoted were our nurses in their work that the rich people of the town sent Miss O'Halloran thousands of dollars to spend as she thought best. There our physicians and nurses taught not only the City officials, but the citizens, rich and poor alike, a great lesson in Sanitary Medicine. Notwithstanding the great responsibilities which our head nurse carried with her all the day and at times all night, when she came to submit her account of the moneys received and expended, they were found to balance to a cent.

Another interesting experience was that in the typhoid epidemic at Reading where we were very radical in our methods and successful in our results. Our head nurse, in following up the reported cases, got into a house filled with men who impressed her as being a bad crowd. She determined, however, to render help to those who were down with the fever and at the same time had to think out a plan to get assistance. Her inspiration was to persuade these questionable characters to send for one of her staff, which after some debate, they agreed to do. She selected the most timid nurse on her roll believing she would not venture out at midnight without an officer. A note was duly delivered to the desired nurse who agreed to get ready at once and report for duty. Waiting until the messenger had gotten well out of hearing, the nurse, feeling afraid to venture out alone, as her chief had surmised, called upon the police to furnish her an escort to the place where her chief was at work. Upon their arrival, the police were surprised to recognize criminals for whom they had long been searching. I mention this incident merely to show how exciting and interesting public sanitary work sometimes becomes.

At Austin, in Potter County, the breaking of a dam washed away a town of three thousand from, you might say, the face of the earth and it was our duty to render immediate help. Supposing there were many wounded, I seized my desk telephone and called up a number of physicians and nurses belonging to the Department and directed them to proceed to the scene of the disaster at once. When some of us arrived it was a dark, rainy night, somewhat illumined by the last flames of a burning kindling wood factory, but even by this uncertain light we at once appreciated that few could have escaped death who had not reached high ground before the flood with its floating timber struck the town.. The survivors were so demoralized that they were helpless. That night there was little for the nurses to do except to visit the houses fringing the valley above the water line of the flood and try to find sleeping places for the homeless. This, those who arrived earlier had been doing. After dawn the nurses had a little sitting-up sleep in an ordinary day railway coach. By this time we had food and clothing moving toward the scene of the disaster. In the morning, although there were no patients for them to nurse, we found it necessary to assign them various other duties, some to the morgue where they aided in the preparation of bodies for burial and the identification of the dead, their feminine perceptions peculiarly fitting them to meet the heartbroken relatives of the victims; some to assist in sorting out the clothing which was now arriving in large quantities, the gift of generous persons in all parts of the State, and distributing it to the almost stripped survivors; others to cooking and serving food and hot coffee to the starving people and workmen, faint from toil and fasting and chilled with the drenching rain, while others again gave out the raw food-stuffs, now being delivered in abundance to those of the people who still had opportunities for preparing and cooking them. This service required careful inquiry and the exercise of sound judgment as it was essential to distinguish between the mere sight seers, who swarmed over the ruins and would not hesitate to appropriate the food and clothing designed for the sufferers, and the legitimate recipients. These manifold extra duties to which they were unaccustomed they undertook most cheerfully and performed most satisfactorily. At the same time physicians were actively looking out for communicable diseases, conditions being most favorable for an epidemic or rather epidemics. The second night our straw mattresses had arrived from Harrisburg. These we placed on the floor in Odd Fellows Hall, so that the nurses could take turns in getting some sleep.

These few words about the unexpected work in which you may be called upon to assist and to which you should always cheerfully respond, give you a peep into a little of the variety of work which comes in the way of a sanitary nurse.

The Coatesville epidemic of typhoid fever is the one in which Miss Katharine Gillespie was given her first great responsibilities. She was at the head of the nurses there. She organized the hospital in the building loaned by the Elks. The work was so well done that we had but one or two secondary cases, but our own loss was great, as Miss Gillespie, who was not strong physically, overworked herself, and was stricken down with a fatal nephritis. During her stay she was elected an honorary member of the Elks and when she died the townspeople paid her a touching tribute. If a history could be written about our nurses, we certainly would record for all time some good seconds to Clara Barton and Florence Nightingale. They have won laurels wherever they have done their noble work.

One broad work they are doing over the State is the visiting the homes of the tuberculous poor. They enter the home, sometimes to find an anarchist at the head of the family. Instead of a warm welcome they are greeted with a fierce scowl and the door is slamed in their faces. Now, if ever, is your opportunity to demonstrate your diplomacy—and all women are born diplomats.

This makes an awkward condition of things. You may even have to push yourself in as you think of some kind word to say. If it be a mother with a child, attention directed to the child alone will often take the wire edge off your hostess' wicked expression. Once in and a child conquered, it is generally safe to say to the mother that you have come by order of the State to assist the Mr. Jones (her husband) who was examined at the Dispensary. The ice broken and the hostess resigned to her fate, you can ply your questions as to the habits of Mr.

Jones. These facts learned, a lesson of warning may be given to the mother as to the danger she and her children are in unless the careless habits of Mr. Jones as to the disposal of his infected sputum are corrected. The uses of the sputum cup and the paper handkerchiefs and individual drinking cups given to the patient by the State are carefully explained. The necessity of boiling the knives, forks, spoons and plates used by that patient, that the entire family may be protected is urged. The advantage of plenty of fresh air and sunlight are fully enlarged upon. The kind of food-stuffs which cost the least to purchase and which will furnish the proper nourishment to maintain health and to make the children grow and resist the attacks of disease can be pointed out and described.

Possibly you can even venture to suggest the importance of keeping their hands and faces clean.

The proper care of food-stuffs, milk in particular, can be taught.

A lesson in cleansing the teeth with a rag if they are too poor to purchase brushes may also be given.

Here I may call your attention to the good that may be done by referring the parents to some charitable society so that they may receive help during the time the sick one is too ill to make full wages, or some philanthropist may have his or her attention called to the needs of the family.

This may be enough advice for the first visit. Before leaving, however, you must pave the way for the next visit. Sometimes it will be sufficient to measure one of the children and promise to bring a pretty paper pattern for a little dress, and then wishing them good luck, take your departure with a kindly smile.

The second visit will be more of a love feast after you have presented the pattern of the little dress. Possibly you can compliment one or more of the children upon having clean hands and faces. This will open the way to speak of the necessity of clean clothes and to venture the suggestion that it would be well to have clean windows so they will admit more light.

A little help can be offered by demonstrating to a child how to wash herself, or if there is a child of sufficient age, that one can be taught how to wash her little sister so as to make her look pretty.

A lesson may be given on cooking oatmeal with an improvised fireless oven.

After you win the good will of your poor patient a more careful and thorough inspection of the children personally can be made, for instance, a mouth breather may be discovered and the mother invited to bring the child to the dispensary.

At the third visit the dangerous character of measles may be explained and attention called to the necessity of keeping children out of houses where the disease exists. It may even be suggested in some cases that the afflicted parent may have contracted tuberculosis becaus of having been left susceptible, to the infection from an attack of measles or whooping cough. The other diseases of children may be lectured upon at another visit. By kindness and diplomatic teaching the mother and children soon look forward with pleasure to your coming visits.

Lessons can be given on the management of the stoves so that the escaping gas may be prevented from poisoning the air of the room.

Our nurses have often succeeded in having the windows and steps not only of the houses they have actually visited cleaned but also of those in which the neighbors live. The example of their scholars has stimulated others to do likewise.

The necessity of vaccination against smallpox and the horrors of that disease can be pictured to them. Before your visits end you will be rewarded by the discovery that the muscles of the children are hardening, the disposition of the entire household is becoming more cheerful, the cuss-words lesss frequent, that the parents are beginning to look upon the Government as a friend instead of an enemy, and that the Health Officer has also been a blessing by cleaning away the germs of disease by disinfecting the home. If the father happened to have tuberculosis in the early stage he may be markedly improved, or, if the case is a favorable one, sent to the sanatorium.

Not only have you improved the health and hapiness of the family but you have converted the enemy of the Government into a good citizen.

From what little I have said you can realize what a vast amount of good can be done for the individual and for the nation. You leave all these people missionaries to sow seeds of good wherever they go.

Before closing I wish to remind you that much that has been suggested as good advice to the poor can be applied to those financially better off whom you will meet in your private practice. In your private nursing it will be your duty to be dignified, willing and helpful to the family not only directly but indirectly by being kind and sometimes helpful to the servants. Your duties to the doctor in charge and patient have been taught you in this good training school.

You have already learned that the medical men of today, through long and laborious years of study in their science, have placed themselves in diagnosis and treatment, beyond the power of the comparatively lay mind to criticise. The medical profession, like all others, however, has its black sheep and when it is made apparent to you that you are associated with impostors or abortionists, you should report to your fraternity that they may, in turn, report such persons to the authorities, who have the power to disarm them.

Wishing you every success in your chosen vocation I can assure you it will always be my pleasure to assist you whenever opportunity offers.

P416h

1912
LIBRARY

Pennsylvania Health Bulletin

No. 34. HARRISBURG, PA. APRIL, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

HOW TO ORGANIZE A BABY SAVING SHOW.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912

Pennsylvania

Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 34. HARRISBURG, PA. April, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

How to Organize a Baby Saving Show.

Any earnest set of men and women who go about the work systematically can organize a Baby Saving Show which should prove of inestimable value in saving the lives and bettering the conditions of the helpless infants in their community. Summer is the best time to hold a show, as the death toll among babies is highest then.

One baby in every seven dies the first year after birth. Your neighbor's baby perhaps, your own possibly. Thirty-five thousand and thirteen babies belonging to someone died last year in Pennsylvania. Why? That is the question on every Mother's lips when she is brought to understand that the shadow of death may fall across her baby's crib.

To answer this insistent "WHY" every town or village should hold a Baby Saving Show. It is estimated that 50 per cent of the deaths of infants are due to conditions within human control. To show what these are and how they can be remedied so clearly that every Mother may see and understand, is the purpose of a well planned Show.

Everything about it must be concise and practical that Mothers of every nationality and grade of intelligence may make the desired distinction and carry away in their minds, a clear mental picture of that which is injurious and that which is helpful for their babies.

The first step in organizing a Baby Saving Show is to enlist the co-operation of the agencies in the community directly concerned in public health, charitable work, and civic welfare. In most communities these are embraced in the Societies for Organized Charity, the County Medical Society, the Board of Health, the Board of Trade, the Civic or Welfare Clubs, the Trained Nurses Organization and the Churches and Church Aid Societies. In addition to these agencies it is essential to secure the co-operation of the local newspapers.

These various organizations should be brought together and a general committee appointed which in turn can appoint sub-committies to cover the different sections of the work such as:

Finance, Housing and Decoration, Publicity and Printing, Nursing and Feeding, Bad Conditions, Care of the Baby, Lectures and Diseases of Children. The titles of these various sub-committees are suggestive but the duties may be briefly outlined.

FINANCE. The committee on finance should be composed of the influential members of the Board of Trade, Board of Health, Medical Associations and Civic Clubs. The actual financial outlay for a Baby Saving Show should be comparatively small but the necessary expenses for printing, decoration, literature, etc., must of necessity be covered.

In view of the broad nature of the work and its benefits to citizens of every class, it may be possible in many instances to obtain financial aid from the city council. This may be supplemented by subscription lists and a tag day or entertainments, the proceeds of which would go to swell the fund.

HOUSING AND DECORATION. The housing committe in whose charge the locating of the Exhibit comes, should find little difficulty during the summer months in securing the City Hall or County Court House or a public school building. The two latter are usually vacant at that season.

It is advisable of course, to obtain as central a location as possible. As the beneficial effects of a Baby Saving Show should be greatest among the poor, it would be wisdom on the part of the housing committee to select a location adjacent to the more populous section of the town or city.

It will probably be found necessary to erect a few board partitions in the hall as screens in order to give sufficient wall space for placing the charts, models, diagrams, etc., which will make up the Exhibits.

These can be built of light wood and covered with burlap bunting or any other similar material. The lumber necessary for this purpose, can readily be used again and arrangements can undoubtedly be made with some local dealer who for a nominal sum will furnish the material required and take it back at the close of the Show.

HEALTH.

PUBLICITY AND PRINTING. The attendance at the Baby Saving Show will depend largely on the Publicity and Printing Committee. As previously mentioned the co-operation of the local newspapers is essential to success. The proprietors and editors of the local papers should be seen personally and if possible, their service secured as members of the publicity committee.

If this is impossible, full details of the work and plans of the various committees should be furnished each local paper daily for a week prior to the opening of the Show. Quarter sheet advertising cards should be printed and placed in prominent show windows and if the local bill-poster, with whom the summer season is usually dull, will agree to post bills without charge or at reduced rates it is advisable to have one sheet posters printed, setting forth concisely the location, date and purpose of the Show.

In advertising emphasis should be placed on the free admittance and it is well to make the title FREE Baby Saving Show.

In addition to newspaper publicity and bill posting, it would be advisable for members of this committee to visit every clergyman in the city, particularly those whose congregations are made up of the foreign population and the poorer class of citizens. The clergymen can aid greatly by calling the attention of their parishioners to the Baby Saving Show and advising attendance. Probably a Baby Sunday can be arranged in the churches, the clergymen preaching on the subject and calling particular attention to the purpose of and the necessity for a Baby Saving Show.

NURSING AND FEEDING. This committee should have at least one medical man among its members. It should take up the question of the milk supply and point out in a practical manner the dangers of unprotected milk, the dangers of dirty dairies, careless handling of the products by milk dealers and should show practically how good milk can deteriorate after it is delivered to the home thru lack of proper precautions.

The superior chances of the breast fed baby over the bottle fed baby should be clearly pointed out. In arranging this Exhibit the medical man's knowledge is absolutely essential.

BAD CONDITIONS COMMITTEE. For the obvious reason that it avoids confusion and allows the observer to carry away a clearer mental picture, it is advisable to collect in a single section of the Exhibit, all of the things which are detrimental to the Baby. A number of models suitable for this section are described elsewhere in this Bulletin.

CARE OF THE BABY. There are a variety of exhibits which the committee having this division in charge can make to illustrate graphically the proper methods of caring for infants.

At a Baby Saving Show recently held in Philadelphia there was a series of dolls in this section, dressed as babies should be during the various seasons. There were models showing home made ice boxes for the proper keeping of milk, screened cribs and open air sleeping arrangements for babies.

In connection with an exhibit of this character it is advisable to bear in mind that the majority of those mothers who are to be benefited by such exhibits, have small incomes and the suggestions for the betterment of conditions, should be planned in the most economical manner.

An excellent practical demonstration may be made by fitting up two booths as rooms, side by side, exactly the same in size and character and containing precisely the same furniture, e. g. a bed, table, chair, stove, one window and a door. Use an ordinary clothing store dummy to represent the mother and a doll to represent the child, show the insanitary and hurtful practice of allowing the child to sleep with the mother. Nail the window shut and stuff it with paper, show unclean cooking utensils and infant's bottle, dirty dishes, unscreened door, flies and insects about.

In the corresponding booth show a simple crib manufactured from a box, covered with mosquito netting, show the windows open and screened with netting, a screen door, clean dishes, and tidy floor. Make the room as attractive as possible without any addition except the home manufactured baby crib.

LECTURES. The arrangement of the lectures may readily be divided into two classes. Those to be given by physicians which should cover the physical welfare, nutrition, care of the mother, etc., and those relating to civic improvements effecting the health and general welfare.

If possible, certain evenings should be arranged for lectures to the various foreign residents. These special lectures may be advertised thru the newspapers published in their own language or thru their clergymen and physicians. If in a local community any one foreign element predominates, the signs should be in their language as well as in the English.

DISEASES OF CHILDREN. This is a section which should be in charge of a committee of physicians. Charts showing the value of treatment to prevent blindness, prevalence of intestinal diseases, charts showing the weight of healthy babies, etc., may go to make up this booth.

It is advisable to have literature setting forth some of the essential features in the proper care of infants, for distribution to visitors at a Baby Saving Show.

The State Department of Health, will upon application furnish for distribution, to any organized Baby Saving Show Committee in Pennsylvania its "Save the Babies" circular in English, Italian, Polish, Slavish, Yiddish and German. In addition to these, it will furnish a set of mottoes printed on cards 22 x 28 which will make an interesting exhibit in themselves, and serve as a guide in the preparation of additional material. Upon request additional suggestions will be furnished.

* P416h

1912

Pennsylvania
Health Bulletin

No. 35. HARRISBURG, PA. MAY, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH

SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

DROWNING

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912

Pennsylvania Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 35. HARRISBURG, PA. May, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

DROWNING

PREVENTION.

Almost everyone is liable to be exposed to the danger of drowning sometime during life, hence all children should be taught to learn to swim just as they are taught to walk. Very few lessons as a rule are needed, and when once learned the art is rarely or never forgotten. It is advisable, if at all possible, to learn by the aid of a skilled instructor, but if this is impossible, the use of a board or plank placed under the chest, or the so-called swimming wings that serve the same purpose, may be necessary.

When in danger of being drowned the individual should remember that in order to keep afloat the hands and arms should be kept under the water and in motion; when they are held out of the water, the head is almost immediately submerged. It is not at all difficult to keep afloat, if this rule is followed, as the human body is of nearly the same specific gravity as water. If one can keep his presence of mind a very slight up and down motion of the hands and feet, paddling as a dog swims, will be sufficient to keep the head above water, and can be kept up for a long time without tiring. If unable to keep the head above the surface constantly, every time it goes under the mouth should be closed and the breath held, thus preventing strangulation.

Prevention of chilling the body is of the greatest importance, and if there is long continued exposure in the water as in the case of ship-wrecks, it is advisable to put on an abundance of woolen clothing, if at all possible.

In salt water when the current sets out from land, as when the tide is going out, it is a mistake to struggle to reach the land. One should throw himself upon his back, whether alone or encumbered, and await help from the shore. Many persons perish by exhausting themselves in vain attempts at swimming, especially against the current, when it would have been safe to float with the face up, and to wait until rescued.

RESCUING.

If there is no one present who can swim when an individual is drowning, a plank or any piece of wood or rope should be thrown to him to which to cling, urging him to keep his hands under water and to keep both hands and feet in motion.

Before swimming to the rescue of a drowning person, one should relieve himself of as much clothing as can be quickly thrown off. Be sure to loosen the legs of drawers if they are tied at the ankle. If this is not done, the garment is likely to fill and to act as a drag.

Do not touch the drowning person so long as he still struggles. Wait until he becomes quiet, otherwise he may grapple with you and render you helpless. As you approach the drowning person, assure him in a firm voice that he is in no danger if he will keep quiet. Catch him quickly by the hair or collar, or under the arms, turn him on his back and give him a quick pull. *(Fig. 1.)*

This last movement will bring him well up on the surface of the water for a moment. Now quickly throw yourself on your back and haul his back up to cover your stomach; the back of his head will then be on your chest; with both hands holding him, one placed on each side of the lower jaw, swim for your destination. *(Fig. 2.)*

If one is a good swimmer he will get to safety in this way sooner than any other. Moreover, one will be able to keep his own face as well as the face of the person who is being saved, above water. By maintaining the position described—the rescuer on his back and the rescued lying face up on the rescuer's stomach—one also will find that it is possible to float for quite a long time.

If the person sinks before being reached, watch for the bubbles rising from the lungs, which will often enable you to locate the body. In flowing water allowance must be made for the direction and rapidity of the current, as it will carry the bubbles down stream from the body. In diving after a body you should seize it with one hand only, leaving the other hand free to be used in rising to the surface.

FIRST TREATMENT OF THE APPARENTLY DROWNED.

The first impulse in discovering the body of a drowned person is to summon a physician. Unfortunately, however, under circumstances attending this accident the physician is so infrequently present or within reach that the most valuable time is lost in searching for one. Upon discovering a body every effort should be made at once to resuscitate the victim. It is of the utmost importance that everyone should understand the few simple measures necessary to retain life; and, as it may be necessary to maintain efforts for a long time, it is important that all methods should involve as slight an outlay of the rescuer's strength as possible. In each instance the aim should be to restore breathing. If the heart has ceased to beat, the person is probably dead, but the time required to determine whether this is the case, may be fatal Efforts to restore respiration should be begun at once. Very efficient methods for the restoration of respiration by various mechanical devices are in use by large industrial corporations and by many institutions and are of service when one is apparently dead from electrical shock or from inhalations of water, gas, smoke or poisonous vapors. The following method, if carefully carried out, will give maximum results:

RULE I. PRELIMINARY TREATMENT.

Do not move the patient far from the scene of accident unless he is in danger of freezing. Do your best to keep people from crowding around and shutting off the air. Wipe dry the mouth and nostrils, quickly open the clothing sufficiently to expose the chest and waist. Turn him upon his face, placing one forearm or some other prop under the forehead to keep the nose and mouth free from the ground, keeping the face turned down and heading to the wind, as you want all the movement of air possible. Place a roll of blanket or clothing under the upper portion of the abdomen just below the tip of the breast-bone, as shown in *Figure 3.* Turn his body on its side for a moment and slap the bared chest smartly two or three times with the open hand and let him fall into his former position. *(Fig. 3.)*

If the patient does not immediately begin to revive, proceed according to Rule II.

RULE II. TO EXPEL WATER FROM THE BODY.

Separate the jaws and keep them apart by inserting something hard between the teeth—a piece of wood, rock or cork, anything to keep the mouth open. *(Fig. 4.)*

Take position astride the patient's hips with your elbows resting upon your own knees, and your hands over the body ready for action. Make pressure on the base of the chest until the flow of water from the lungs is slackened. Relax and again make pressure, alternating relaxation and pressure until the lungs are empty. This procedure should not last longer than thirty or forty seconds and permits the entrance of sufficient air to stimulate respiration.

RULE III. TO PRODUCE BREATHING.

Clear the mouth and throat of mucus by means of a handkerchief, piece of garment or any rag wrapped around the forefinger. If ammonia, bay-rum or ether is at hand, use the fumes to stimulate respiration by holding the bottle in front of the nose. Turn the patient upon his back with the roll so placed under him as to elevate the stomach above the rest of the body. Let an assistant, using a handkerchief, draw the tongue out at the corner of the mouth and keep it projecting between the lips (this prevents the tongue dropping back and closing the wind-pipe). Now let another assistant, placing himself above the patient's head, grasp the patient's arms just below the elbows and draw them steadily upward and over until they extend past the head, parallel with the ground, the hands meeting, as in *Figure 5.*

(This movement expands the chest and induces inspiration.) The person at the head now moves the patient's arms down beside the body as in *Figure 6.*

The assistant who holds the tongue, changing hands if necessary, so as not to interfere with this movement. Just before the patient's arms reach the position last described, the man standing over the body will grasp it with both hands, letting the balls (base) of the thumbs rest on either side of the pit of the stomach, and allowing the fingers to fall into the depressions between the short ribs. Now using his knees as a pivot he will, at the moment the patient's hands touch the ground, throw (but not too suddenly) all his weight forward on his hands and at the same time squeeze the waist, increasing the pressure while he slowly *counts four*, and after a final push lets go. (A child or a delicate person should of course be handled more gently). At the instant the pressure on the chest is released, the operator at the patient's head will again draw the arms upward and hold them extended beside the head while the *count of four* is repeated. This manipulation of the arms and chest is called the bellows movement. It should be kept up deliberately and perseveringly.

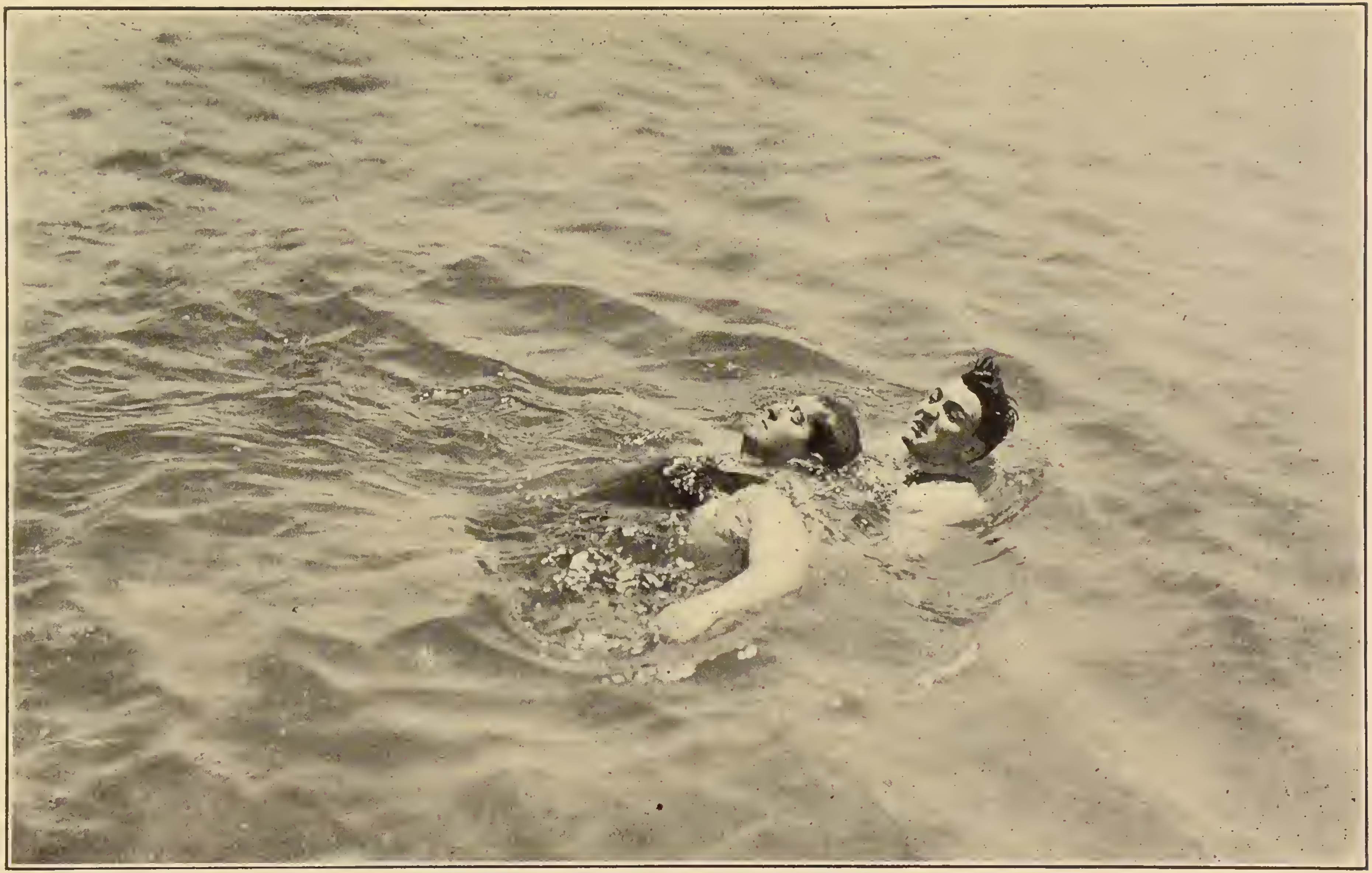


Fig. 1. Grasping the Body for Rescue.

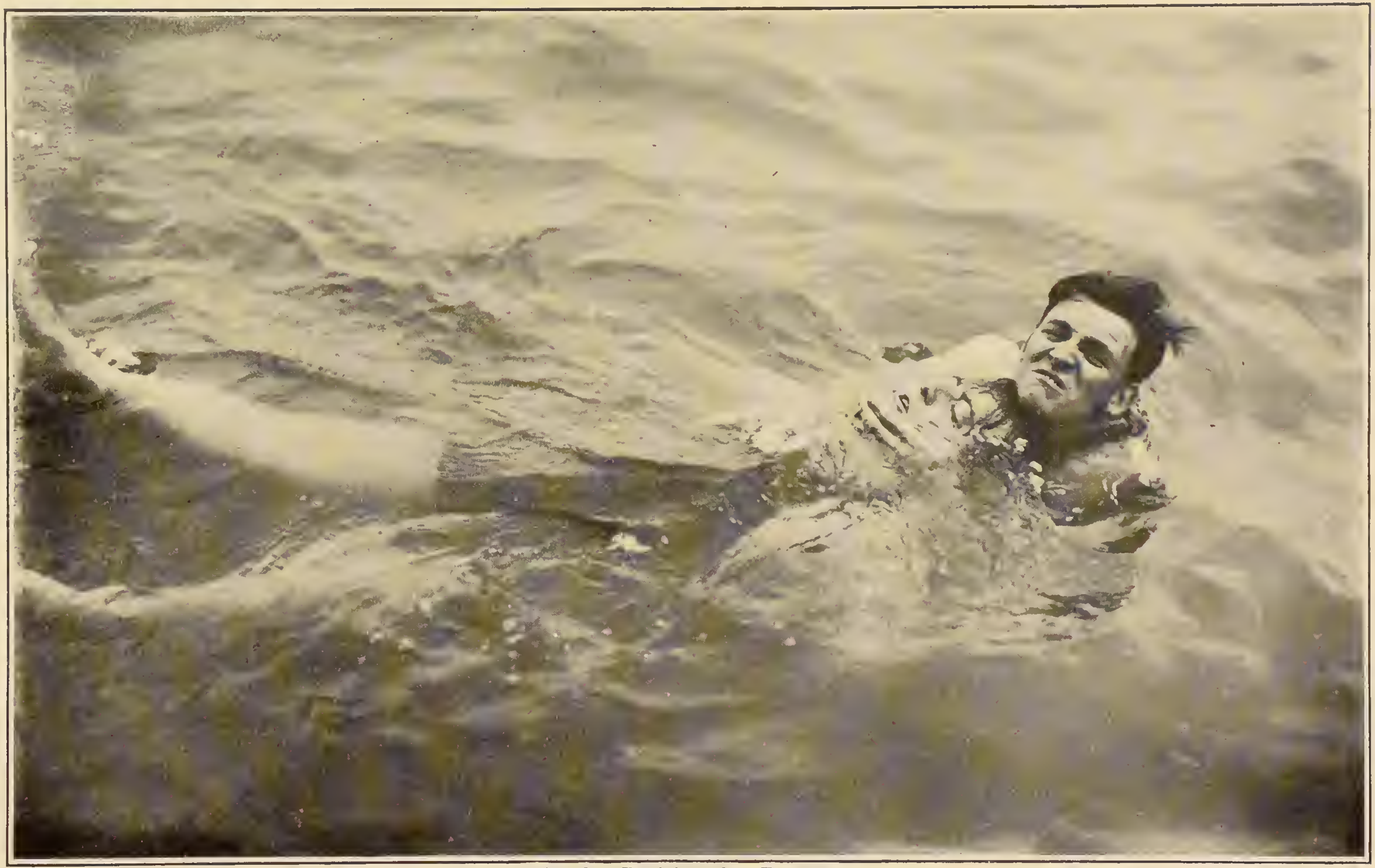


Fig. 2. Position for Resuce.

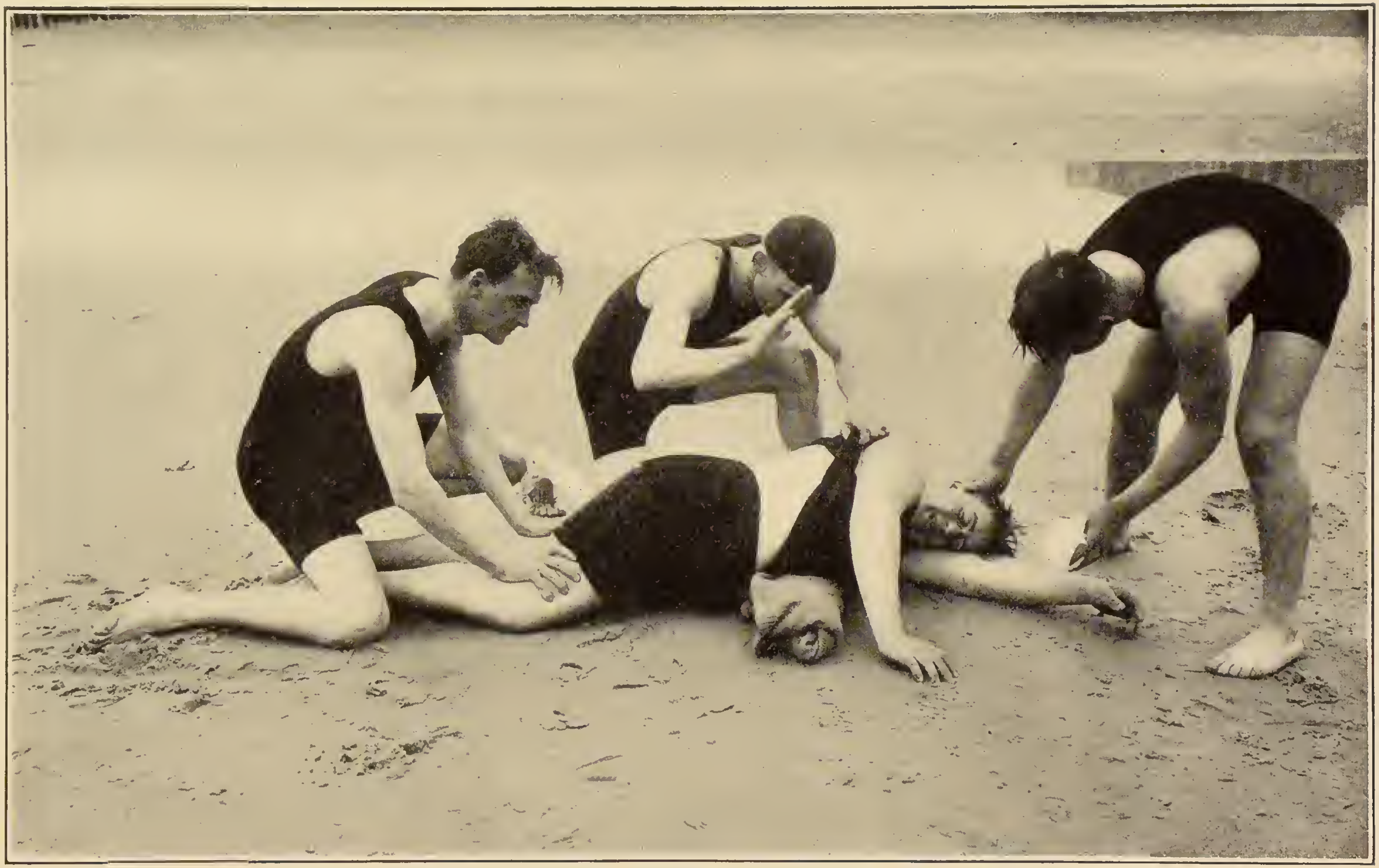


Fig. 3. Stimulating Respiration by Slapping and Massage.

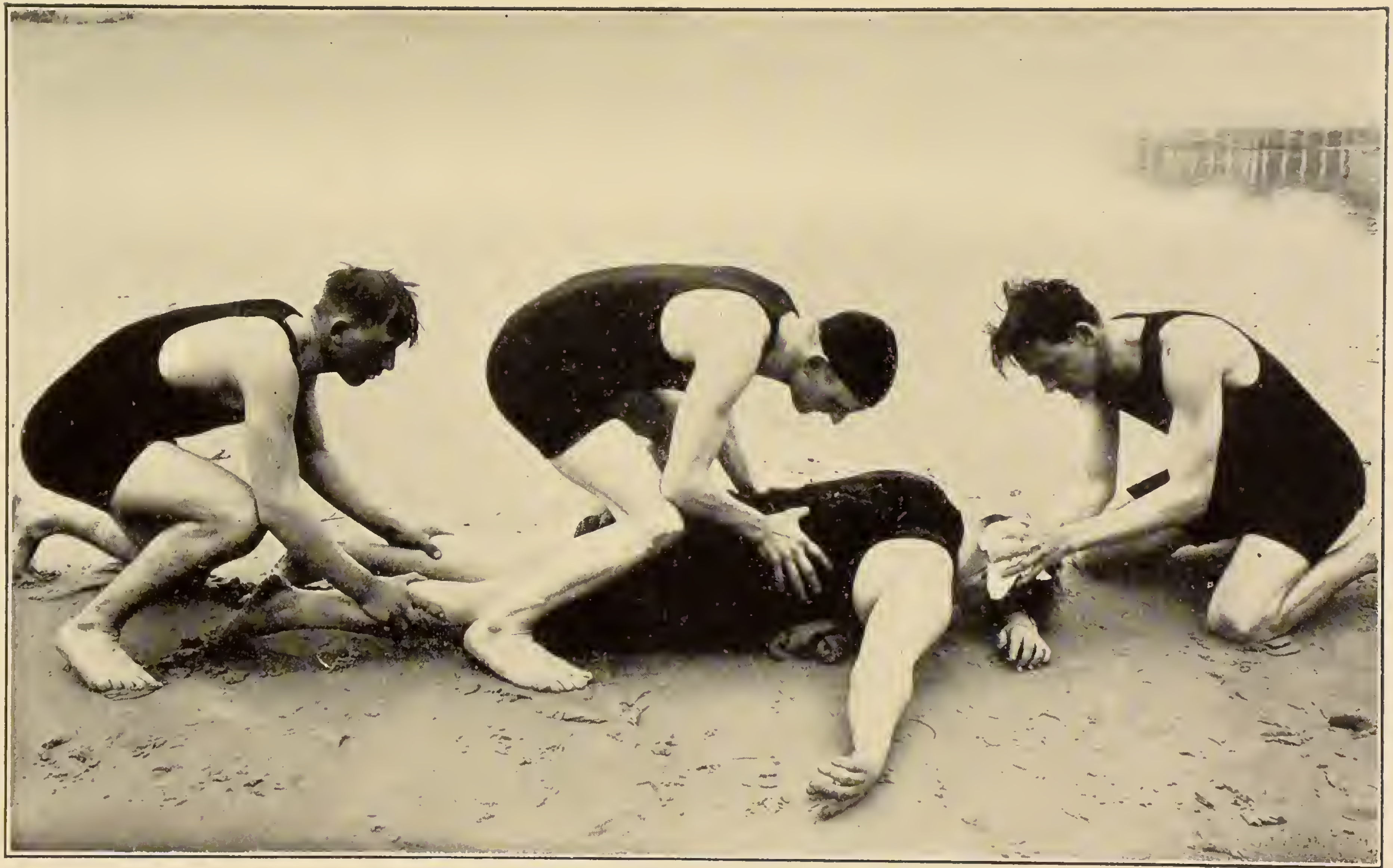


Fig. 4. Expelling Water from Lungs and Stomach.

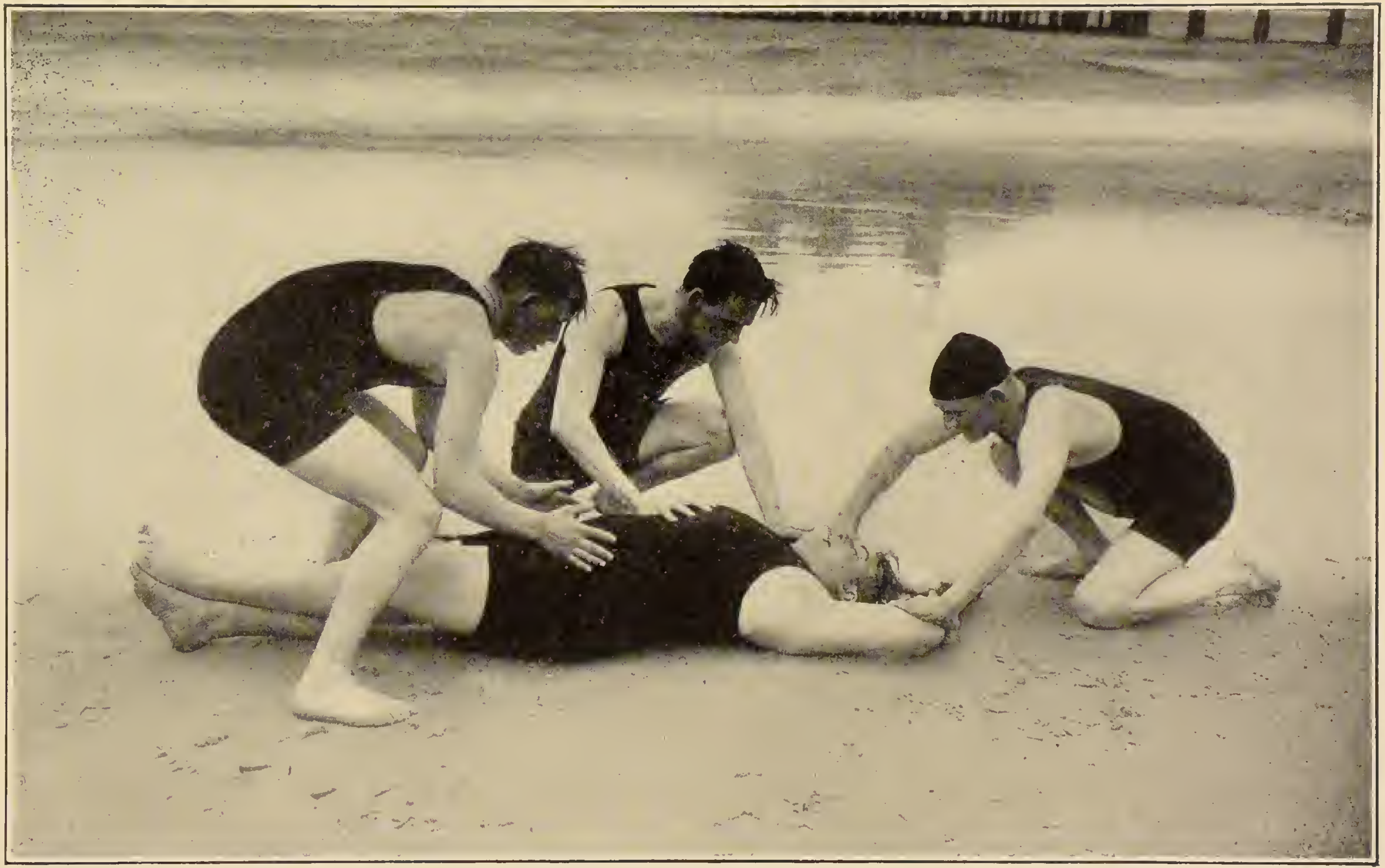


Fig. 5. Inducing Inspiration (more than one operator) Tongue Held by Handkerchief.

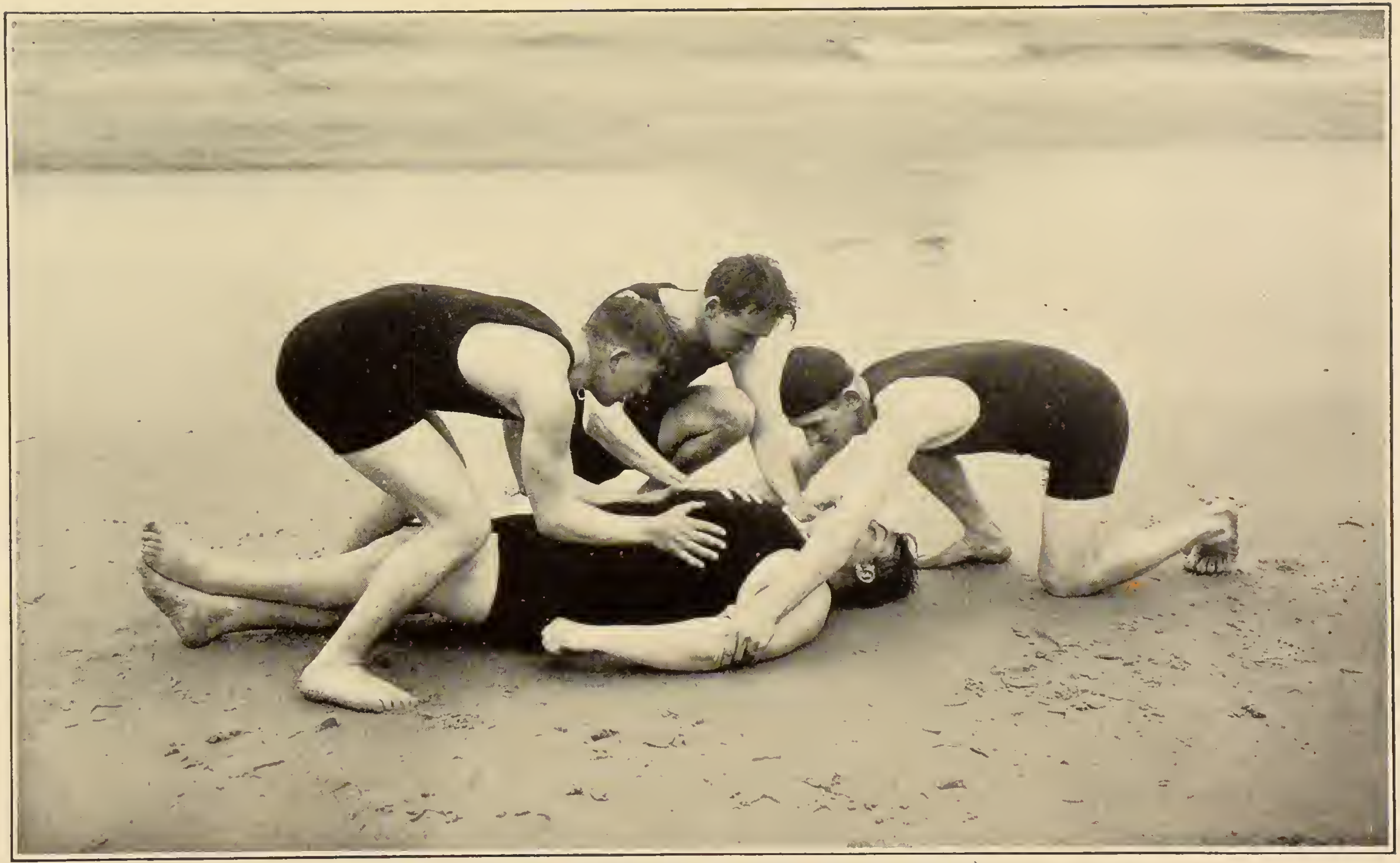


Fig. 6. Inducing Expiration (more than one operator).

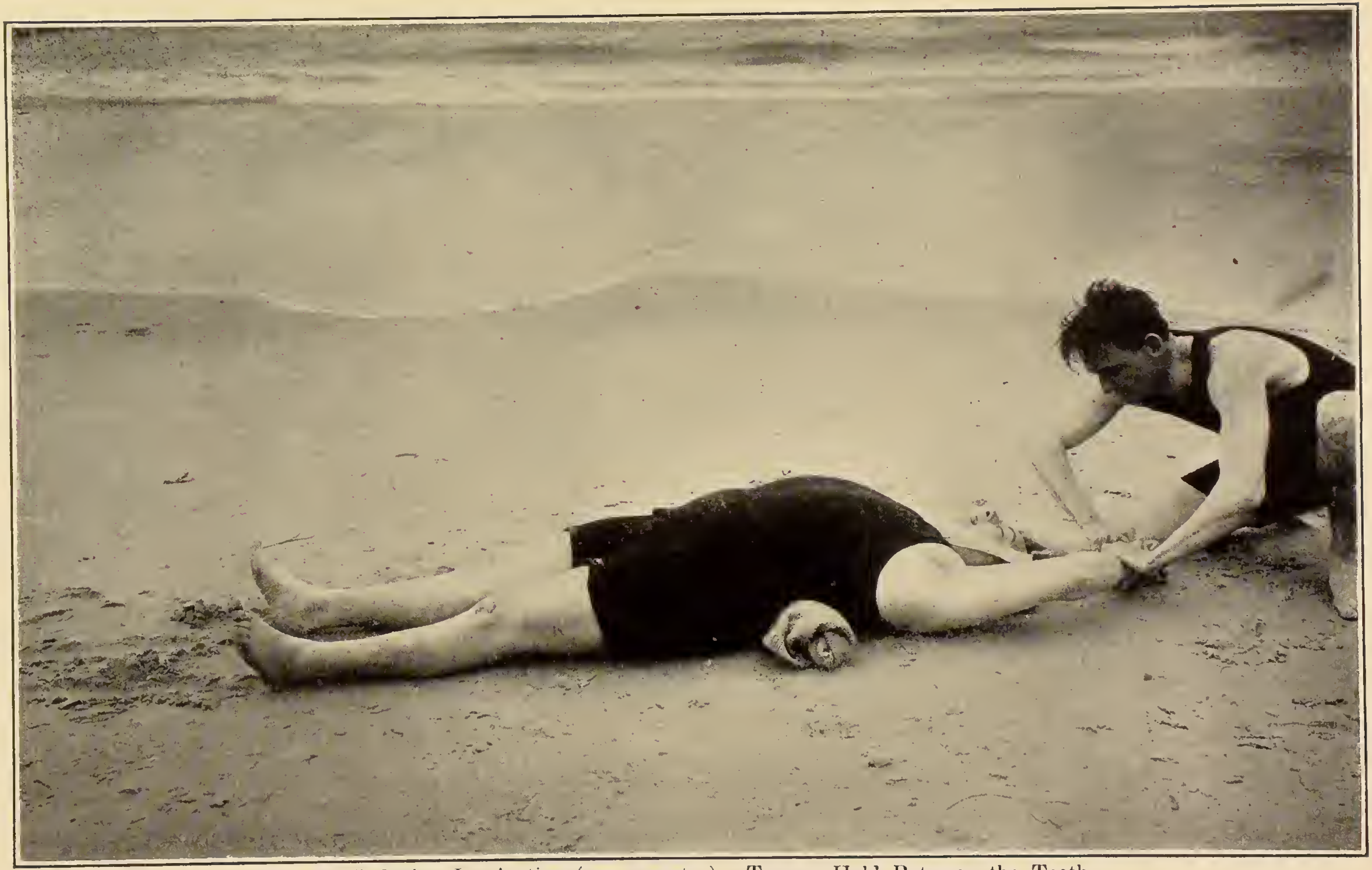


Fig. 7. Inducing Inspiration (one operator). Tongue Held Between the Teeth.

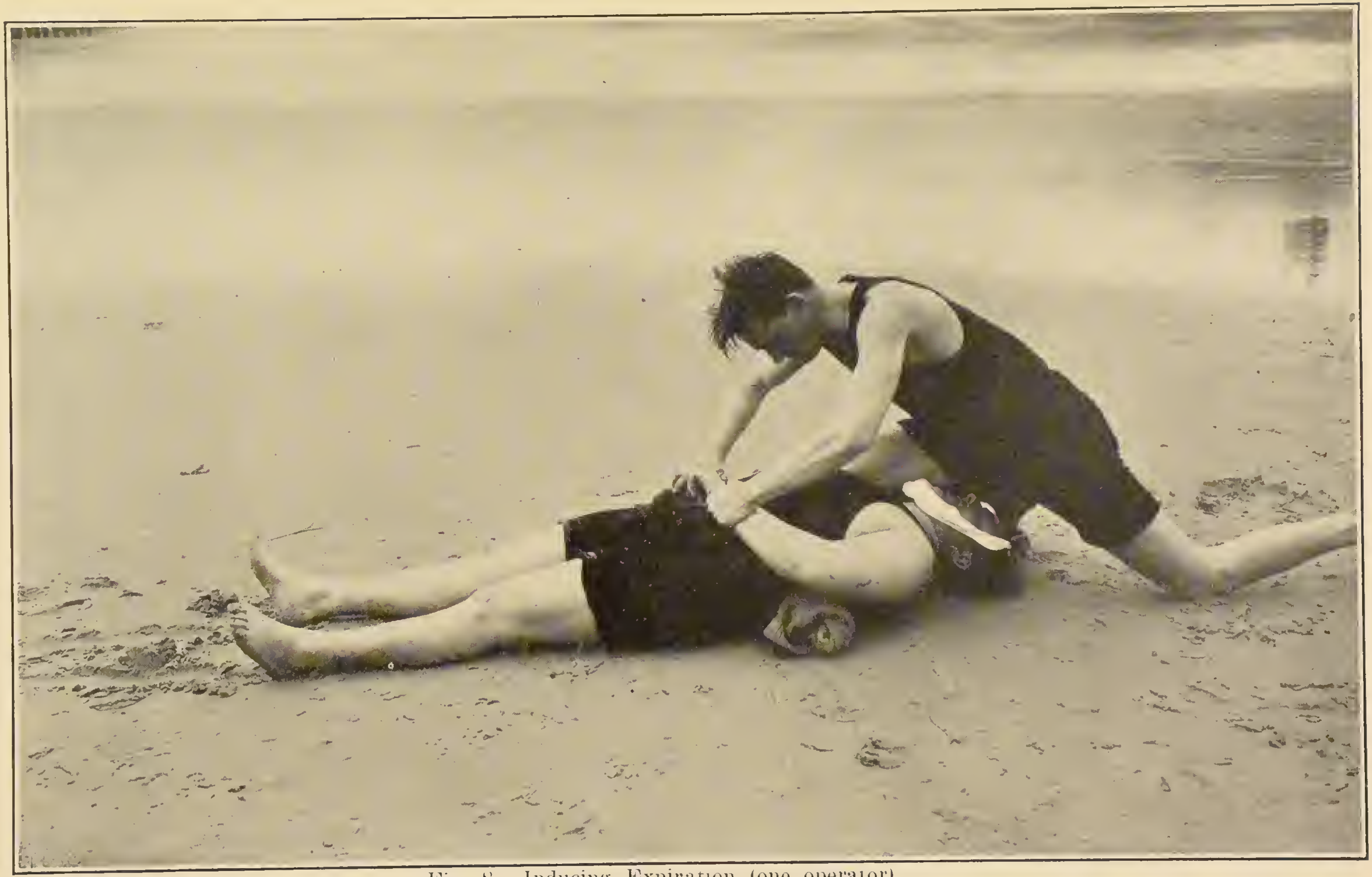


Fig. 8. Inducing Expiration (one operator).

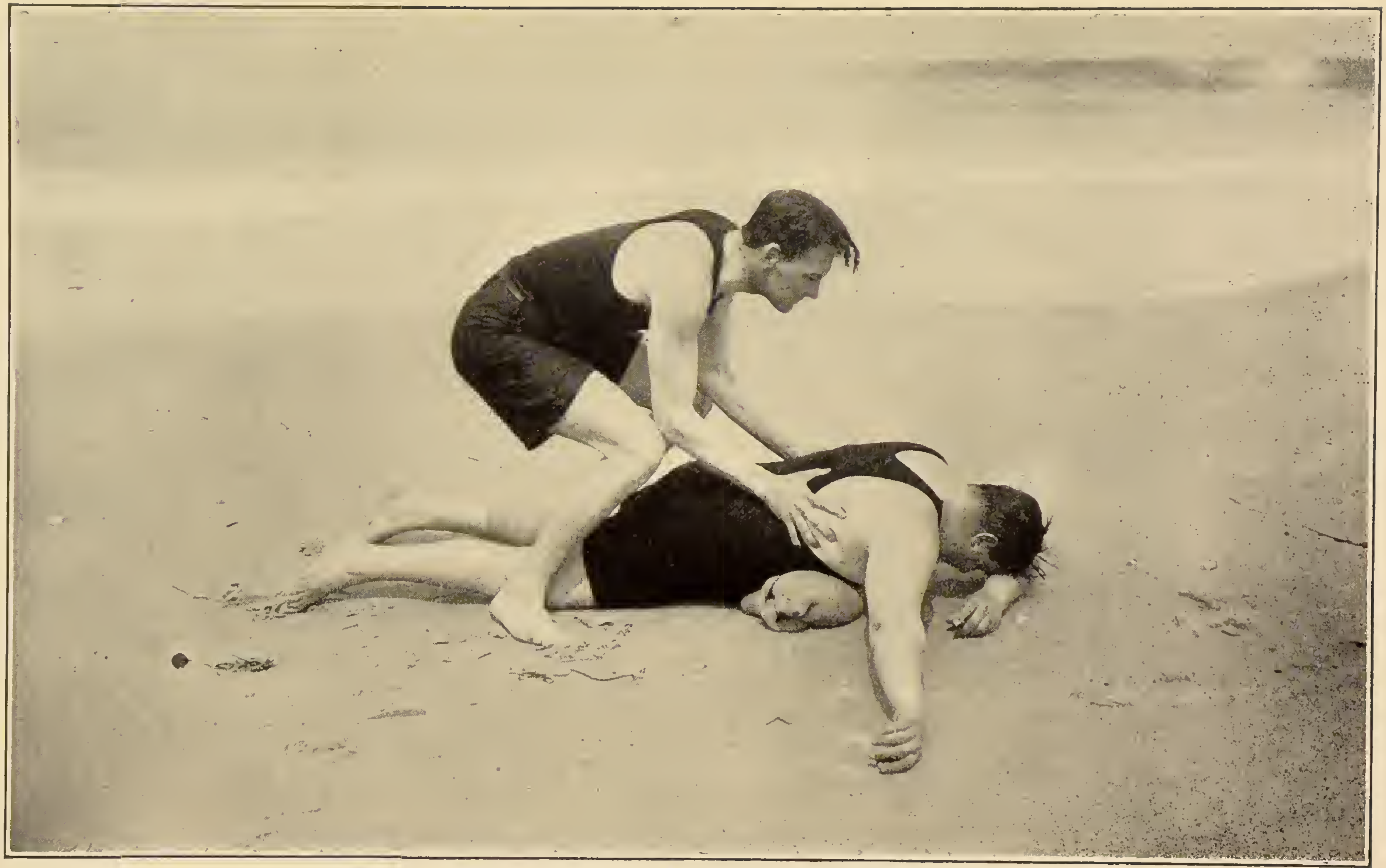


Fig. 9. Inducing Inspiration by Relaxation of Pressure.

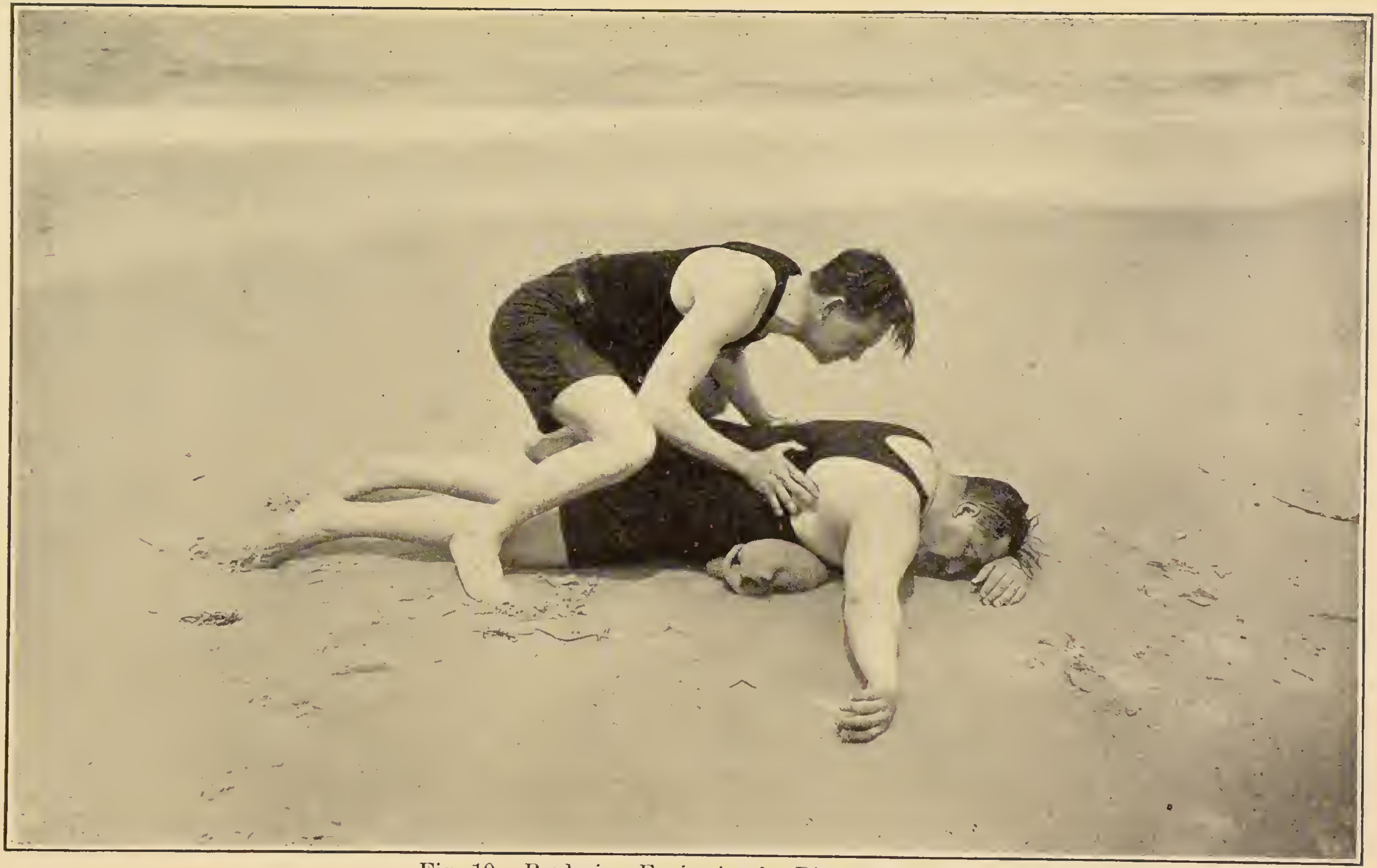


Fig. 10. Producing Expiration by Direct Pressure.

If natural breathing be not restored within say, four minutes it may be because the air passages are obstructed by mucus or water. In any event turn the patient again upon his chest and do as directed in Rule II, rolling the body over in the opposite direction from that in which it was turned when the rule was first followed. After repeating the directions of the rule turn the patient once more upon his back and continue artificial respiration for from one to four hours, or until breathing is established or a physician has declared him dead.

While care should be taken not to interfere with the action of those working the bellows movement, the limbs of the patient should be rubbed from the very beginning if a sufficient number of persons are at hand. The rubbing should be done *always toward* the body with a firm grasping pressure, using the bare hands, dry flannels or handkerchiefs. If possible, warmth of the body should be promoted by the application of heated flannels to the stomach, and hot water bags or heated bricks or stones to the limbs and soles of the feet.

WHEN NO ASSISTANTS ARE AT HAND.

If one person must work alone, first, do as directed in Rules I and II, then place the patient face up, as in *Figure 7.*

With rolled blanket or clothing under his back, take position above the patient's head; grasp arms near the wrists and draw them steadily upward and forward (movement to induce inspiration) as instructed in Rule III. Next lower them (here the operation differs from that employed when two persons are working the bellows movement) to the patient's sides, bend them and bring them toward each other until the hands meet over the lower ribs, then press downward and inward with a firm, steady pushing movement, as in *Figure 8.*

Repeat these movements while counting as directed in Rule III. If the jaws be separated the teeth may be made to hold the tongue at the corner of the mouth by passing a handkerchief under the chin and tying it over the head.

ALTERNATE METHOD.

If the patient has been in the water for a long period of time or, if for any reason the work of resuscitation depends upon only one person, the following method can be used and can be kept up for a longer time without great exhaustion.

The patient is placed on his abdomen in the position shown in *Figure 3.* The operator kneels across the patient as in *Figure 9,* the hands being placed at the base of the chest over the lowermost ribs in such a way that the extended fingers are about six inches below the armpits. *(Fig. 9.)*

Now swing your body forward so as to have your weight fall at a slight angle on the wrists; the elbows are braced against the knees so that the weight of the body is augmented by such pressure as may be had by forward pressure of the feet and legs; the legs act as the fulcrum. *(Fig. 10.)*

This makes lateral and slightly upward pressure on the base of the chest and expels the air from the lungs. Swing back, releasing the pressure as shown in *Figure 9,* and the lungs fill by normal expansion.

Repeat this motion slowly, about 12 times per minute, exerting no more force than is necessary to cause a deep expiration, the latter can be estimated by the sound made by the air escaping from the mouth and nostrils. (Be careful not to make too deep, sudden or violent pressure as injury may be done to the organs beneath.)

When the patient is beginning to breathe, the process of artificial respiration should be stopped. Place the patient on his back and press the base of the chest *every other time* he breathes *out,* as described under Rule III, *Figure 6.* This should be continued until he can breathe naturally (not too rapidly) without assistance. As soon as this is accomplished the measures described as the "After Treatment" should be carried out.

RULE IV. AFTER TREATMENT.

As soon as breathing is established the patient should be stripped of all clothing, wrapped in blankets and put to bed comfortably warm, but with plenty of fresh air. Whiskey, brandy, or other stimulants, and hot water, should be given in teaspoonful or dessertspoonful doses, at intervals of ten or fifteen minutes during the first hour.

After reaction is fully established there is danger of congestion of the lungs, and if perfect rest is not maintained for at least forty-eight hours the patient may be seized with great difficulty in breathing. If this happens death is likely to occur unless immediate relief is afforded. In such cases a large mustard plaster should be applied to the chest. Should the patient begin to gasp before the plaster takes effect, carefully assist respiration by the bellows movement as explained in Rule III.

P 416 h

1912

Pennsylvania Health Bulletin

No. 36. HARRISBURG, PA. JUNE, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE HEALTH OF SUBURBAN RESIDENCES.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 36. HARRISBURG, PA. JUNE, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

The Health of Suburban Residences.

(These brief hints with regard to the location and construction of suburban residences are the results of many years of experience, both in inhabiting and building houses in the country and it is hoped that they will prove useful).

The necessity for a Summer vacation has long been recognized by both the business and the professional man. The longing to get away from brick walls and city irks and cares during the intensely heated season for a short spell and the call of the wild could not be resisted, and, as long as means of locomotion were limited and costly, most citizens had to content themselves with such a brief respite. But with the multiplication of railways and suburban trains, and with electric tramways penetrating the country in every direction, with improved roads and the speeding autocar, the country has suddenly been brought so conveniently near to the city that large numbers of denizens of the town are beginning to feel that they and especially their children are not getting as much out of life as they are entitled to and that at least half of the year, possibly three-fourths, ought to be spent among the delights of the field, the meadow and the forest.

Under this altered condition, a word of advice to those who are contemplating availing themselves of these opportunities from one who has himself made the experiment much to his own satisfaction, may not be unwelcome.

It is taken for granted that the person contemplating such a move has duly considered the question of expense and will be prepared to make a reasonable outlay in order to insure, first of all, a house which will promise good health to the inmates. It has therefore been deemed wise to suggest ideal conditions so far as health is concerned, leaving economy to be practiced in non-essentials.

The citizen will probably be compelled to visit the city for the prosecution of business if not daily at least twice a week, and as he may not consider himself warranted in going to the expense of an automobile, the choice of a location should be determined in great measure by accessibility to a railroad or trolley line. Of course if the autocar has been included in the estimate, this requirement may be disregarded thus affording a much wider range for the selection of sites and greater opportunity for the indulgence of fancy as regards landscape advantages. If the exposure to the dangers of ill-ventilated coaches on railroads, and overcrowded trolley cars, particularly at the hour when industrious wage earners are hurrying to their homes, can thus be avoided this is so much to the good.

The general location having been selected the actual site must be chosen with care. The first essential is dryness. The soil should be naturally well drained. It is, therefore, well to avoid valley bottoms and hollows, where the rain will collect in pools in sudden downpours, and the night condensation with fogs and mists will saturate the air with moisture. At least the average elevation of the surrounding country and residences should be sought.

Dust is detrimental to health; therefore it is wise in selecting a residence in a rural district to keep well back from a public road. Before concluding upon the site one should survey the neighborhood for public nuisances from which offensive gases, smoke or dust may be carried by the winds to the home.

Before the topographical considerations are settled for the site, we must consider the geographical formation of the surface and subsoil. A glacial or broken rock formation, extending a foot or more below the foundation of the cellar walls affords perfect drainage. A solid serpentine rock formation is very expensive to blast out, but makes a tight, dry cellar, as also do all chalk formations. If you are compelled to build on a clay formation good glacial gravel or glazed terra cotta pipes should be used for building drains, so that any water that settles down along the cellar walls can be readily drained off. Some of the shales make a fairly dry ground to build on and a broken hard sandstone is not objectionable. Mosquito breeding pools and swamps are to be avoided on the score both of comfort and of health.

While trees are a delight to the eye none of any size should be allowed to encroach so closely on the house as to drop dews and rain upon the roof or to prevent the sun's rays from reaching it through the day. Forests to the North and West, not so near as to throw shadows on the building at an earlier hour than two hours before sunset form an excellent wind screen against our northwestern blasts.

The general purifying influence of the sun may also be encouraged by making the house long and narrow so that the broad side may face the South, thus receiving also the full sweep of the southern winds, so refreshing in the heat of the summer in this latitude. If economy must be closely considered, a square house will be preferred and this should face or back to the southeast.

One of the most important adjuncts to the house is the porch and this too, or these, for it is often desirable to have more than one, should be built in such a way as to shut off the sun from the walls of the house as little as possible. It is not desirable to have them long and narrow, hugging the walls and cutting off the sun's rays from the first floor and the cellar. A better shape is either square or a parallelogram. The long way of the latter should be placed at right angles to the house. Either will give a porch throwing a minimum of shade on the wall, while at the same time by its spacious breadth it permits the occupants to retire from the hot sun or the rain, whereas if the porch be long and narrow, they will often be driven into the house by either. The porch thus becomes the most delightful room in the house during the entire hot season.

A second story porch for sleeping purposes is also a most salubrious addition to a house and should never be neglected. No room can be designed that permits of the natural movement of fresh air as does an open veranda. This can no longer be regarded as a mere frill or luxury.

The point to have in view in all our rooms, but especially in our sleeping rooms, is to secure a moving body of fresh air. Three thousand cubic feet should be allowed for each person every hour. To sustain vigorous health we must live in a moving body of fresh air, warm or cold, both day and night. The arrangement for this purpose is called ventilation, and it is a matter greatly neglected, especially by architects, whose chief object is to construct a house which will be pleasing to the eye. This object should be kept in view from the cellar to the attic.

Ground should not be broken nor in fact should it be purchased until a good, pure, wholesome water supply has been provided, with pure water to drink,—the first essential to health. Water found in lime stone formation is almost sure to be polluted. The fissures in limestone will carry water long distances almost as well as iron pipe will. So well was this fact appreciated by old-time dwellers on such formations that it was their habit to bore down until they found a limestone fissure and then drain their sewage into it, a very convenient means of sewage disposal for themselves but death to their neighbors. How many cases of typhoid fever, apparently unexplainable, may not have been caused in this way! This has led health authorities to forbid that method of draining cesspools in certain localities. In such regions you find some of those beautiful gushing spring spouting out great volumes of crystalline but infected water. These have often been prized both for power and for domestic purposes, but the science of today often demonstrates their absolute unfitness for the latter.

Open streams vary much in the degree of their purity. This depends upon the character of the water sheds. The banks are often occupied by dwellings which drain their sewage directly into them. They often run along or under railroads where they catch the sewage from the passing trains, or near and along public roads from the gutters of which they collect the sewage from the wayfarer.

Surface water, to be safe, should be filtered unless it is carried in pipes from a noninhabited and untravelled watershed.

Surface springs depend upon the formation through which they travel as well as on the water shed which collects them. The water travels under the surface until the formation of the earth's surface permits it to again flow out at a spot called a spring.

Deep wells, tubed down into sandstone and carefully cased off, generally produce a fine water. The purity of the water must be determined from a physical examination of the watershed as well as by the tests of the chemist and bacteriologist.

If a storage tank is used for a private water supply it should be made of unpainted wood, preferably gulf cypress or cedar. Black iron covered with asphaltum makes a safe storage tank. Lead or galvanized iron should not be used. The top should be covered with a fly screen to preclude the entrance of insects, rats or mice.

The intake should enter the top at the opposite end from the outlet. The latter should enter about three inches above the bottom so as not to disturb the sediment in the bottom of the reservoir.

Those preliminaries having been satisfactorily attended to, we are ready to dig our cellar. The cellar should extend over the entire area of the house. The floor should be water tight, constructed either of cement or asphaltum so that rats cannot find their way into the cellar. All vermin, large or small, of whatever kind, are dangerous to health. The inside walls would better be finished of some material that can be washed or easily cleaned. The cellar should have an eight foot ceiling and should be well furnished with windows for light and air and even sunshine. A damp-proof course should be introduced in outside walls just below the first floor joists. The material of the walls is a matter of taste but it should be remembered that a soft stone makes a dryer house than a hard rock. All stone walls should be lined with hollow terra cotta brick. Hard burned brick, lined, makes a good wall. The roof should be both fire and water proof. Wooden shingles make an attractive and dry house, but the asbestos shingle is equally dry and the same time fire proof. They are of course cheaper as a rule than other materials.

In determining the height of the cellar the heating arrangements must be taken into account so that if it is desired to introduce steam or hot water heating there may be sufficient headway to ensure a ready return of either to the boiler. The heating system may be a hot air furnace fired by coal, gas, sprayed oil or wood, depending upon the locality. The heating surfaces in any system should be supplied with fresh, outdoor air robbed of its natural wind movement as much as possible by a receiving chamber or chambers so that the air when warmed may be forced along by the falling of the cold outdoor air upon it and driving it up the hot air flues to the dwelling parts of the building. This is called *indirect* heating. Direct heating in living rooms, offices or public buildings is the cause of much ill health and the loss of many useful lives. *Direct* heating is a system in which a steam or hot water radiator is placed in a room or hall, thus simply heating the same air in the building over and over again after it has been chilled, principally by the cold glass in the windows. Such air is soon robbed of its oxygen by those occupying the room and becomes filled with organic matter from the exhalations from the human body. Living in such an atmosphere the blood soon becomes poor and the different organs in the body are starved and fail to do their work, and then the body falls a victim to all sorts of diseases.

The hot air flues should be built of terra cotta. It is economical to have a continuous tin flue inside the terra cotta so as to conserve all the heat. While the outside walls are colder, the heating register is always better placed on the outside walls or near them in one of the cross section walls, as the movement is generally from the outside wall and therefore you get a more uniform distribution of warm air through the room. Forced ventilation is too expensive for the large majority of rural homes.

If a hot air furnace is used water should be kept in the hot air chamber constantly and the furnace kept in perfect order to prevent the poisonous gases from leaking into the former to be thus distributed throughout the house.

When stoves or furnace or boiler fires are banked at night the fire door should not be used to check the draft. If however, it is so used, a candle or lighted match should be held at the top of the door as it is being opened to gauge how wide to open it. It should never be opened wider than to the point where the flame is drawn into the fire-box, otherwise the gases will escape into the room. This same process should be adopted with the lid of the range fire in the kitchen. The air of houses is often charged with poisonous gases from the kitchen fire on account of the coal being built up above the top of range or the lid having been so far removed that the gases escape into the room instead of being drawn into the fire and passing up the smoke flue.

Open fires are good as auxiliaries to other methods of heating. This will overcome the dangers of the pernicious direct radiator system if sufficiently large to demand 500 cubic feet of fresh air per person every hour.

The plumbing should be of the most sanitary kind. The soil pipes must be carried above the highest point of the roof. All fixtures should be trapped. The lavatories and bath tubs must be plugged at the bottom and not back in the waste pipe as that would leave some part of the dirty pipe to fill with water and then back up into the lavatory or bath tub water that would be drawn to wash in. A chain attached to the plug is a very insanitary arrangement and should be forbidden by law. An old fashioned standpipe or a plug worked so that it is forced up or down from an arrangement outside the tub are both highly sanitary.

Equally important with the securing of a good, wholesome, abundant water supply is the provision for its disposal after use. To flood a house with water without making ample arrangement for its ultimate disposition is to commit an absurd blunder which must lead to much subsequent annoyance and trouble. In fact the sewerage should have the first consideration. The reverse plan is like "putting the cart before the horse."

The sewage, including the bath water and kitchen waste, must not be discharged into surface or underground streams. It can be passed into cement cesspools where the use of water is not too excessive, otherwise the cost of cleaning out would be prohibitory. The cesspool can be often cleansed by pumping off the effluent, disinfecting it and using it for fertilizing where sufficient ground can be had. Gravel, broken stone, and disintegrated iron formations can be used for percolating cesspools when far removed from streams or shallow wells used for drinking purposes. Filter plants consisting of biological tanks, sprinkling beds and sand filtration and disinfecting tanks can be used so that the effluent can with comparative safety be permitted to pass into streams. The careless disposal of house sewage has cost the American people millions of lives, much suffering and great loss of productive mental and physical labor. The disposal of all sewage should be directed by a sanitary engineer.

Ventilation can be secured by introducing warm air into the main hall so that the well of the stairway is heated. This must extend up to a vent in the roof. Outside cool air is introduced through transoms over the doors on the first floor which open from the outside. These transom sashes should be hinged at the bottom so that the incoming air first strikes the ceiling instead of being directed immediately to the floor. The bed rooms should also be provided with transoms opening into the second and third story halls, so as to permit of cross ventilation. Now with the doors of the first floor rooms open we have secured a free movement of air all over the house. No room, not excepting the bath and toilet rooms, should bo built without a window, opening to the outside air. Each bed room should have at least two windows of good size extending from a foot below the ceiling to at least two feet above the floor, preferably in walls at right angles to each other.

The first and second stories should have at least ten foot ceilings, the third floor eight to nine feet.

The lighting is important. Water gas is highly poisonous and, therefore, when used the fixtures should be kept in perfect order, with the stops so constructed that there is a good shoulder for the key to turn hard against so that it can not be turned too far around and thus leave the gas partly on when the handler believes he has turned it completely off. The fixtures should be placed beyond the reach of children.

Coal gas is much less dangerous yet should be carefully guarded against. Acetylene gas is less dangerous to respire but when mixed with too much of the atmosphere it will explode. It is, however, a pungent gas when breathed and therefore its presence is easily detected.

Electric light is dangerous on account of fire unless the wires are well insulated and passed through tubes along their entire course. This is the dictum of the Insurance Companies.

The best light for the eyes is from lamps placed in a bowl with a reflecting lining, hanging from the ceiling. This will throw a diffused light over the room when the reflected rays strike a light colored ceiling.

Stables. All stables should be kept cleared of manure, this being placed in pits and screened so that flies can not enter to lay their millions of eggs. To guard against insects and vermin carrying filth into your house and onto your food the dwelling should be screened. The kitchen and dining rooms should be certainly screened if one cannot afford to protect the entire house.

1912

Pennsylvania Health Bulletin

No. 36. HARRISBURG, PA. July, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

REPORT OF THE AUSTIN DISASTER.

By SAMUEL G. DIXON, M. D., LL. D., Commissioner.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1912

Pennsylvania

Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 36. HARRISBURG, PA. JULY, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

Report of The Austin Disaster.

By SAMUEL G. DIXON, M. D., LL. D., Commissioner.

On the evening of Saturday, September 30, 1911, when sitting at my desk at my BrynMawr home, the 'phone rang. The call proved to be from the Harrisburg office, bearing the news that at Austin, Potter county, Pennsylvania, a dam holding back about 200,000,000 millions of gallons of water had given way. The entire Sinnemahoning Valley had been swept with a roaring flood bearing a raft of drift wood grinding and sweeping everything in its death path. The wood acted as a countless number of battering rams. Houses, railway construction and rolling stock had been crushed and carried with the churning waters to be deposited over an area of five miles of the valley. The houses had given up their human occupants to be ground to death. In this seething mass all the domestic animals of the borough had been carried away. The report stated that nearly one-third of the inhabitants of Austin, which had a population of three thousand, had either been killed or wounded.

Realizing that the Act of Assembly of 1905 gave the Commissioner of Health the power to do anything to protect the health and lives of the people of this Commonwealth, and that the Legislature, in its wisdom, had made its appropriations so as to meet the uncertain-ties of life, enabled this Department to assist in the emergency, at least to the extent of doing those things which would save life, relieve suffering and prevent epidemic of disease.

To add to the unfortunate affair it happened late on Saturday afternoon, when the Department's people were scattered over the State to vote at the Primary Election.

Notwithstanding that the report had only been received in the Department at Harrisburg a short time before I received the 'phone call at BrynMawr, doctors, engineers and even nurses had been corralled at headquarters as well as messages sent out calling those to service who were living along the railroads leading to Austin.

Immediately upon receiving the news at BrynMawr, calls were put in for the County Medical Inspectors in the territories surrounding Potter county, so they might go immediately to the scene of disaster. Several of the answers informed us that their men were already at work at the flood-stricken district—some of them having arrived there forty minutes after the accident occurred.

An engineering corps composed of the Chief Engineer and four assistant engineers, a staff of employees of the Medical Inspector of Dispensaries, five dispensary physicians and five dispensary nurses left Harrisburg and intervening stations Saturday evening on the 10.57 train, which arrived in Austin before daybreak Sunday morning.

From BrynMawr I was able to find our people throughout the State and have them leave for Austin from their respective homes, which resulted in having a good force of well trained specialists on the ground before Sunday night.

Early on Sunday the Department took charge of the destroyed water system and communicated with the Natural Gas Company, so as to have light and heat restored. Food and clothing were then en route: this, of course, would have to be systematically handled and protected from the mob. The State Constabulary was communicated with and their men rushed in to the scene from the territory directly surrounding Austin, which prevented pilfering and enabled everything to move systematically. General Stewart, of the State National Guard, had by this time, sent a train off with his men, food stuffs, overcoats and tents.

Leaving an experienced emergency man in the Harrisburg Office, who was ready for work either by day or night, I ventured to leave for Austin early on Sunday, and arrived there that evening in a pouring rain, fully realizing the sad and demoralized condition of affairs. The fire at the kindling wood factory was illuminating the country so that one could see there was little or nothing left of Austin up to the water line along the hill sides. Above the water mark stood a large frame building occupied by the Odd Fellows. This had generously been handed over to the local Relief Committee and the State Officials. Here we at once established our headquarters. Upon the arrival of our engineers and physicians on Sunday morning, endeavor was made to press the local people into service, but it was soon found that they were so demoralized that they were of little or no use. It was then determined to send to the nearest places for help, which proved to be a success as the officials of different municipalities in Pennsylvania and New York responded immediately, and the railroads made wonderful progress in moving trains to the scene of disaster. Food stuffs and clothing soon began to arrive which, of course, was of great service, but it was necessary that an immediate account of stock should be taken and kept so that the necessary things could be ordered by the Department without duplicating those supplies sent by philanthropists. Major Finney of the National Guard took charge of receiving all the supplies and under his direction, the National Guard erected a large mess tent and put a competent man in charge so that our workmen could be fed. The Constabulary continued to keep peace and prevented plundering. A safe water supply was soon provided, bridges were built so as to restore travel from one side of the valley to the other. A dining room was provided in Odd Fellows Hall so that the suffering citizens might be fed. A building was obtained on the hillside from which we distributed clothing to sufferers. Food supplies, clothing and bedding arrived in abundance to care for the homeless and for our workmen at Austin and its immediate surroundings. As soon as darkness fell, after the flames of the burning buildings were extinguished, work on the wreckage became next to impossible. But as time was an important element some means of general lighting became essential. An offer of the General Electric Company of Schenectady was therefore accepted, proposing to install a temporary electric lighting plant. A representative of the Schenectady works arrived at Austin at noon on October 6th and the principal installment of apparatus on the day following. The machinery was transferred to a box car which was used as a temporary power house. Pole lines were erected and eight arc lamps hung, the Philadelphia office construction forces arriving at noon. The plant was tested out with gasoline secured from a wrecked automobile and was ready to operate at noon on the 8th. On the 9th three more arc lamps were installed, the latter being used on the laborers' mess, cook tent and officers' mess tent.

Of course, one of the most important duties devolving on the Commissioner was the protection of the water supply and the prevention of typhoid fever and intestinal diseases due to water pollution. The following communication addressed to the Burgess and Council of Austin, Wednesday, October 11th, indicates the necessity for this work and the steps taken to accomplish it, which it is a pleasure to state were crowned with success.

"To the Honorable,
The Burgess and Towns Council,
Austin, Pa.:

Gentlemen: The borough water works system prior to the flood comprised the Austin Springs, the spring near the pumping station as the principal sources and several drilled wells about town from which water was raised by air lift, all of the water being delivered to the receiving well at the Main street pumping station from whence it was forced through the distributing pipe system laid in the streets of the borough, the overflow going to a masonry reservoir of 235,000 gallons capacity located on Good Year hill, by means of which a pressure of 125 pounds was maintained in the major portion of Austin on the flats. About 40 fire hydrants were located at selected points.

The Commissioner of Health issued a permit in 1906 to the borough to acquire an additional source of supply from the Vanetta Springs located about one mile up the west branch of Freemans creek from the town. The Department is not informed as to whether these springs have been taken over by the borough but there is an old 6-inch wooden pipe extending from them down the valley into the village in the public highway south of the creek. This line was not supplying water except to a few houses in the west portion of the town along the line. Below these houses the pipe line was cut off and plugged. Whether this was done by the Potter County Water Company, alleged owner of the 6-inch pipe, is not known to the Department.

On Saturday morning, October 1st, 1911, when officers of the State Department of Health arrived in Austin, there was no water anywhere in the town in the public system. The people had to resort to private springs and wells. These were examined, dangerous sources were placarded and verbal notices were given to boil all water. The flood had swept away the hydrants in the devastated districts, wreckage covered the gates in the pipe lines remaining intact, the pumping station contained debris and mud and the pumps required some repairs. The pipe line from the Austin springs was broken but some water was flowing into the pump well. These springs were filled with mud and covered over with buildings washed there by the flood, and the air lifts at the wells were broken.

By Monday night the system in the west end had been put into use and gravity water from the Vanetta Spring was being supplied at Odd Fellows Hall and in the district above it. A hose line attachment had been made from the old wooden pipe near the gate herein before mentioned to a hydrant on the public system. A chemical sterilizing plant was installed and is in use now whereby the Vanetta Spring water is subjected to treatment. All water from the spring supplied to the public has been thus treated.

By Wednesday the gravity service had been extended to the mess tents on the flats and to all buildings between the mess tent and Odd Fellows Hall, including all dwellings south of Freemans Creek.

On October 9th the pumping machinery at the station had been put into shape for use and by means of a 4 inch pipe line 550 feet long laid from near Odd Fellows Hall to the station, Vanetta spring water was available to be pumped into the water works system then in use in event that fire service were demanded, the gravity pressure being only about 25 pounds.

Easterly of the creek on Goodyear Hill there has been no public water supply owing to the impossibility of fixing up the gates, hydrants and pipe lines on the flats. It is believed that the 8-inch force main from the station to the reservoir on Goodyear Hill is intact and that it will be in service this evening in which event Vanetta spring water can be pumped into said reservoir, giving fire pressure in all of the water works system at present in use in the borough. Slight repairs in plugging hydrants easterly along Costello avenue will extend the service to that portion of the borough and this is true with respect to the north part of the town east of Freeman's Creek.

All of the work the Department has done has been in the nature of emergency work to supply pure drinking water and to give fire protection. A spring on the hill was temporarily turned into a gravity supply to the hospital and adjacent buildings on October 2nd. To-morrow these buildings can be put on the public service.

With the above explanation I now wish to hand over to your care the operation and maintenance of the public water works system and on and after 24 hours from the time this communication is placed in your hands, we shall cease to operate your water works system or to continue to repair the same, but we will advise with you. Vanetta spring water only should be used until you can show to the satisfaction of the Commissioner of Health that the other sources are pure and wholsome and suitable for the public supply.

Yours truly,

SAMUEL G. DIXON,

Commissionr of Health."

Two days later, the following warning notice was sent.

"To the Burgess and Members of Council,

Austin, Pa.:

Gentlemen: On October 2 the water from a small spring, the only water available for the purpose, was turned into the equalizing reservoir on Goodyear Hill and temporarily used as an emergency gravity supply serving the Austin hospital and several nearby houses, pending completion of repairs to the borough system. On said date the users of the water were warned not to use it for drinking or culinary purposes without first boiling it, owing to possible pollution. Analyses have since shown positive evidence of pollution and the use of this spring should be at once discontinued as per instructions given to your Water Works Superintendent Sick.

A much used road-side spring on the south side of Costello avenue has been found to be seriously polluted by sewage. This spring should be immediately and effectually closed so that its waters cannot be used for domestic purposes.

Samples of water from the following four private springs or wells have been found to contain sewage organisms and the use of these waters should be at once discontinued unless and until the sources of pollution shall be ascertained and entirely removed.

Spring at Cummings residence on Keating Summit road.

Well at residence of Geo. Huff, adjoining Odd Fellows Hall.

Spring at rear of Emanuel Seyler's residence on Burdette street.

Spring at rear of vacant house next door west of Seyler's residence.

These sources of supply have been placarded with warning notices.

The waters of numerous other springs similarly placarded, throughout the borough, should not be used for domestic purposes without first boiling at least twenty minutes.

Very truly yours,

(Signed) SAMUEL G. DIXON,

Commissioner of Health."

With the aid of Capt. Robinson, of the Constabulary, an extended inspection was made of the Sinnemahoning Valley to Costello, four and one-half miles down stream from the broken dam.

On the ride down this valley of death, parts of houses, trees, iron freight cars dashed to pieces, great iron bridges picked up bodily and deposited on the banks, millions of feet of lumber and pulp wood, bedding, furniture, lumber and stoves, mules, horses, cows, and occasionally human bodies were seen strewn for at least a mile and half below Costello, making a total distance of about six miles. There were very few lives lost below Austin, as a good citizen rode his automobile down the valley ahead of the roaring waters calling to the inhabitants of the valley to flee to the mountains, which was not a difficult matter after they had once decided to leave all their belongings behind them, the valley being narrow and the hillside so steep that they did not have to travel far to reach safety above the water line. The mountains above the water flood mark, below which there was nothing but destruction, were covered with hard woods in the brightest autumnal foliage, with a beautiful interspersing of majestic hemlocks. It reminded one of a magnificent decoration with nature's most beautiful leaves forming a wreath around an immense casket filled with death.

It was very evident that the debris covering six miles of the valley would all have to be moved in search of the missing bodies which were buried under lumber, houses, cars and general rubbish. This required a little army of men, horses and heavy tackle that the crushed houses might be torn to pieces, and that the cars and masses of tangled timber might be dislodged. All this had to be done immediately as the bodies were rapidly decomposing and friends were almost frenzied with despair. This was a difficult task as the railroads through the valley had been destroyed. One branch was left coming in at Costello, and the other coming in just at the upper end of Austin from the Summit. When we took command on Sunday, there was no food, no shelter, and no plateaus to pitch tents upon near our work. On Monday we had five hundred and fifty-five men at work. On Sunday noon, October 15th, we discharged our last laborers, having turned over every stick in the valley, with the exception of a tangle of material at the Bayless Pulp Mill and two piles at the lumber mills all of which was being removed by the owners of the materials, and the three or four officers, bodies being carefully searched for by those in charge. During our stay at Austin there were many interesting and trying events, that might be noted in a comprehensive history of our fifteen days of labor.

I decided on October 3rd to make Costello one of the bases of operations in the recovery of bodies and for relief work. The work from that point was carried on over a stretch of country extending from a point on the Sinnemahoning Creek, two and a quarter miles above Costello, to the hardwood mill on Freeman's Run, about two miles above the upper end of the village, down to which point the Austin forces worked. An assistant engineer, assisted by two inspectors and a general foreman, superintended this work. The force of about two hundred men was housed by the kindness of the Elk Tanning Company in vacant houses belonging to the Company.

On the evening of October 3rd, His Excellency, Governor Tener, Adjutant General Stewart and Mr. Bigelow, Commissioner of Highways, arrived in a special train to inspect the situation and investigate the manner in which the work was being conducted. They met the representatives of the citizens with Senator Baldwin and had a conference, after which they reviewed the entire work that had been done and what was proposed to be done, and apparently being satisfied, retired to their train for the night, arising early next morning and making an inspection by daylight. There was one thing they were certainly convinced of, and that was that our Department, the National Guard, the State Constabulary, the Highway Department and the Department of Charities were working as one piece of machinery without the least friction. They left me in command promising all the help necessary. There was not a suggestion made during the entire stay that was not followed out immediately, and with good cheer. Our census which had been carefully taken from house to house and checked and rechecked by all that could be learned from Austin and those who had fled after the flood, showed that the loss of lives was much less than they had anticipated. We could only account for 77 (?) missing. Out of the 77, 72 were recovered, the bodies being carefully handled, embalmed and handed over to their respective families.

I have gone over the records of the number of employees on the pay roll, day by day, very carefully and the following are approximately correct for the various days:

October	1st,	76
	2nd,	555
	3rd,	645
	4th,	790
	5th,	727
	6th,	842
	7th,	840
	8th,	710
	9th,	793
	10th,	839
	11th,	725
	12th,	676
	13th,	473
	14th,	387
	15th,	271

These, of course, are only the men who were in the employ of and were paid by our Department. In addition to the above, the Pennsylvania Railroad supplied us with a large number of men gratis.

The Norwich Lumber Company, The Emporium Lumber Company, the Bayless Pulp and Paper Company, the Goodyear Company, the Lackawanna Shops and the State Highway Department had men at work, who were paid by the respective concerns. Of course, the number of men employed day by day, as stated above, does not necessarily mean that for the whole of each day we had this number employed. Some of them probably worked only a half day, others only a quarter of a day and some of them only for an hour or so, but the total of the different number of men employed is correct. The largest number of men actually employed under the control and direction of the Department on any one day was 1,464. This was on Sunday, October 8th. For ten consecutive days, from Tuesday, October 3rd, to Thursday, October 13th, they averaged more than 1,000.

Austin Boro Council,

Austin, Pa., Oct. 17, 1911.

Resolved, That the burgess and town council of the boro of Austin, extend thanks, for themselves and the people of Austin, to Dr. Samuel G. Dixon, for the masterly manner in which he took care of our people following the disastrous flood of September 30th, 1911, and for the sympathy and good will expressed in his letter of the 15th inst.

F. N. HAMLIN, Presient.
M. MURRIN, Burgess.

Attest:
F. F. Brady,
Acting Secretary.

Austin, Oct. 15, 1911.

To the Burgess and Council, and the Austin Relief Association, Austin, Pennsylvania:

Gentlemen: This afternoon we completed the government work in your flooded and fired municipality. The water supply we restored to a gravity system. The dangerous waters are posted, while the general supply has been disinfected and has been since the plant was started, safe for drinking purposes. Your man has been taught to treat the water, and this treatment should be kept up and daily samples sent to us for test.

Bridges have been built in your town by our engineers to give you free communication from one part of the town to another. Your people and those down stream, including Costello, have been fed and clothed. An emergency tent has been on the ground, but fortunately no serious accidents have occurred, and only a few minor wounds have been treated.

A thorough search has been made for bodies in Austin and down stream for about five miles, and a scout search for some thirty odd miles down stream. The general results of the search show 72 bodies recovered out of a list of the missing and dead totaling 77. The places to be searched are the jam in the pulp mill and the lumber piles, both of which are being worked over as carefully as we have worked. It is more than likely that some bodies have been consumed by fire and others may be buried in mother earth at any place along the valley for three and a half to four miles down the stream.

We leave with you all our blankets, mattresses, food, tools, etc., as per list acknowledged by local committee. All dead animals found have been burned.

The lumber and pulp companies have agreed to collect all their wood along the valley.

The State Police will still be in charge of the stricken district to maintain order.

We know of no physical suffering existing in the valley.

The State Highway Department is fast repairing the State roads, and the Department of Health will be at your call at any suggestion of danger to the public health.

The buildings we have erected will be yours. The hospital has had turned over to it the few things we purchased for the emergency.

The men from the State Departments have shown their deep sympathy for those in the stricken territory and have worked both day and night.

Our Governor has kept in daily touch with your condition, and if all has not been done for you by the Government which could not be done by your municipality and the companies, individuals and your local relief committee, it has been my fault, yet I have done my best and leave you with a heart almost as sad as your own.

Yours very truly,

SAMUEL G. DIXON,

Commissioner of Health.

Pennsylvania Health Bulletin

No. 37. HARRISBURG, PA. AUGUST, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

GETTING CLOSE TO THE PEOPLE.

CARING FOR THE SCHOOL CHILDREN.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 37. HARRISBURG, PA. AUGUST, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

GETTING CLOSE TO THE PEOPLE.

CARING FOR THE SCHOOL CHILDREN.

From the first day of its active existence the Department of Health of Pennsylvania determined that the veil of mystery with which the general profession of medicine had from early times been wont to enshroud itself was entirely needless and, indeed, out of place in the practice of *preventive* medicine; that Public Health could only be secured by publicity,—by taking the public into its confidence and making them copartners with it in the work of conservation of life and health. Very soon after his appointment, therefore, the present Commissioner of Health instituted the custom of addressing communications to the people, either cautionary or instructive as the occasion might call for, as often as once every week. There has been reason to believe that these brief admonitions were welcomed both by the press and by the public, and as they were almost always called out by some actual emergency or occurrence, it has been thought that it might be well to repeat some of them in a more permanent form.

Clippings.

"Milwaukee, Wis., Sept. 8.

Keeping close to the people, so as to lead them in all movements for more healthful living is the secret of Pennsylvania's successful sanitary campaign, according to Health Commissioner Samuel G. Dixon of that State.

In a paper by him read here today before the American Medical Association, and received with much interest because of the great strides taken by the Keystone State in sanitary work, he said:

"If you were to ask me to tell you the foundation upon which the entire structure of the State Department of Health of Pennsylvania is built, the pivot of the whole organization, the theme that runs through the work of every division, I should say it was *getting close to the people.*

"Clothed with ample power to enforce the broad comprehensive health laws enacted for our execution, we started with this assumption—Our people wanted to be healthy if they only knew how. It was our business therefore to teach them.

"The public press of the State, nine hundred journals strong responded nobly to our call for aid. To every fireside in Pennsylvania they have carried the message of health and life. Civic clubs, labor organizations and the big employers of labor throughout the State were asked to work for the cause and they have been constant and effective mediums through which we have reached the people. From every pulpit in Pennsylvania we have spoken through the pastor to his people and I cannot begin to tell you how much good has been accomplished through this channel. We believe in reaching the boys and girls who will soon be our men and women. And so our tuberculosis and general sanitary exhibit, as it travels through the State, makes a particular point of interesting and instructing the school children. The little people learn the lessons of health themselves and they help us wonderfully in reaching the grown ups.

"And thus by the time our organization was well under way, we found that the people were already coming to us, for instance, to disinfect their homes after tuberculosis.

"Do you not see now what I mean by getting close to the people? Can there by any other result than a general uplift in the social and economic as well as the health conditions among those of our children who need help? We find that such people are beginning to look upon their government as their very good friend and helper. They are learning that the State Department of Health is something more than a mere sanitary policeman; that it's sole aim is to go hand in hand with them as a guide through the darkness of ignorance out into the sunlight of right living."

The organization of each division of the Department was explained carefully and in conclusion Dr. Dixon called attention to some of the important results already accomplished.

"From June 1, 1907 to June 30, 1910, 3,301 patients had been admitted to our State Sanatorium for Tuberculosis at Mont Alto. Many a patient has been discharged with the disease arrested, hundreds have been benefited and many more, whose cases were too far advanced to hope for much aid, have however, been made comfortable and happy and have been provided with a home where they would not be a source of danger to others.

"From July 22, 1907 to June 30, 1910, 32,247 poor tuberculosis sufferers had received skilled medical aid and the attention of trained nurses which the Department's one hundred and fifteen dispensaries provide.

"The death rate from tuberculosis in Pennsylvania has fallen from 134 to 120 per hundred thousand of population in four years. This means a saving of one thousand lives annually.

"From October 1905, when the State began its free distribution of diphtheria antitoxin among the poor, down to December 31, 1909, 20,794 cases of this dread disease, mostly little children, were treated with the life saving serum. We know by statistics that without antitoxin 42 out of every 100 of these children would probably have died; but with the aid of the State's antitoxin the death rate among these poor little sufferers was reduced to 8.48. Free Antitoxin was also given in 15,125 cases, mostly children, who had been in contact with the disease. All but a very few of these were absolutely protected against diphtheria. A very low estimate of the saving of child life resulting from the State's free distribution of diphtheria antitoxin since 1906 is about 8,000 lives,—a pretty good investment of the tax payers' money.

"Throughout Pennsylvania our streams are slowly but surely being freed from pollution. Not so slowly either when the records show that up to June 30, 1910, 21,730 private sources of stream pollution have been abated upon notice from the Department, not to speak of the thousands more that have been stopped through the moral influence of this work. Seventy-six modern sewerage disposal plants have been either built or are in the progress of construction as approved by the State. Two hundred and thirty-six other municipalities and private sewerage corporations are preparing to submit plans for sewage treatment, for only on condition of their so doing have they been permitted to extend their sewerage systems. Already forty-seven modern water filtration plants have been approved by the State and are either built or being erected.

"And what of typhoid fever in view of all this work for pure water? In 1906, 56.5 out of every 100,000 people died from this disease; in 1907, 50.3; in 1908, 34.4; and in 1909, 23.9. That is, there are now living 2,363 people who, had the death rate of 1906 prevailed in 1909, would have died from typhoid.

"In 1906 and 1907, the death rate in Pennsylvania per thousand of population was 16.5; in 1908, it had dropped to 15.7 and in 1909 to 15.3. At first glance this may not seem a remarkable diminution, but in a State with a population of more than 7,000,000 even a fractional decrease is a substantial gain. This appears when you figure precisely what this slight numerical drop means in the actual saving of human lives. Had the death rate of 1906 and 1907 prevailed in 1908, 5,519 more people would have died than actually succumbed. Had this same rate applied in 1909, instead of the decreased percentage recorded by the Department of Health, just 8,388 men, women and children now living and presumably in good health and spirits, would have died. In other words, these matter of fact statistics, when interpreted in their real relation to the welfare and happiness of the State, mean the saving to Pennsylvania of 13,907 lives in two years.

'And we are going to fight on!"

CARING FOR THE SCHOOL CHILDREN.

Harrisburg, February 6.

"In an address before the Convention of city and borough School Superintendents of Pennsylvania held here today, State Health Commissioner Samuel G. Dixon declared that by the systematic medical inspection of schools by physicians the sickness and death rate among school children can be notably diminished and their educational capacity greatly increased.

'Frequent interruptions by illness' said Dr. Dixon 'seriously retard the progress of the individual pupil and occasional interruptions on the part of a considerable number of pupils are detrimental to the morale and discipline of the school and a discouragement to the teacher.

'The most common cause of such interruptions is the prevalence of contagious or communicable diseases among the pupils. The second is defective eyesight and dullness of hearing. It is this unsatisfactory condition of things that it is proposed to remedy by the comparatively recent suggestion of the Medical Inspection of Schools. By this is meant the systematic inspection of the pupils of every school by a physician, daily if possible.

'First inaugurated so far as this country is concerned in the city of Philadelphia among the parochial schools, it was suffered to fall into disuse, and the honor lapsed to Boston, the system now in use in that city being known in Europe as the "Boston plan." So successful has it proven there that the legislature of Massachusetts has during the past year enacted a law making medical inspection compulsory in every school in the State. This may appear a stretch of authority but it is founded on the well known principle that the school authorities, during the period that the child is in actual attendance on the school, stand to the child in the parental relation and are directly responsible for the safeguarding of its health.'

Figures were freely quoted demonstrating clearly that in Boston, New York, Chicago, Milwaukee, Philadelphia and other cities and towns, in which the plan has been in operation for a few years, a very marked diminution in the prevalence of contagious diseases has taken place.

The number of instances in which children were found to be defective in vision or hearing has been remarkable. Children who have always been regarded by their parents and teachers as dull, and their lives thus made miserable, have become intelligent and quick pupils on the remedy of these defects.

In Boston 20.33 per cent. of the scholars were found to be more or less disabled by such causes from receiving instruction.

In conclusion the Commissioner said that he was quite ready to endorse the assertion of one of the school directors of a district in his State that "There could not be a better and more active helper to the State Department of Health than a Medical Inspector for every school district in the State."

Winnipeg, Canada, August 26.

"That Pennsylvania is devoting a great deal of attention to the health of its school children was shown in a paper written by State Health Commissioner Samuel G. Dixon, and read today before the Annual Meeting of the American Public Health Association at Winnipeg, Canada.

The first important step is to provide for the immediate reporting of all cases of communicable disease to the health authorities by physicians. It then becomes the duty of the health officers to at once investigate the school relation of families in which such diseases are reported to exist and to notify the teachers of all schools which are thus in danger of infection, whether by reason of the attendance of other children from the same families or of books or other articles having become infected by the child whose illness is reported. In order to secure the most effective results the Pennsylvania Department of Health has included a larger number of communicable diseases in the list to be reported by physicians than has been usually required by the laws of most states. These additional diseases are chicken-pox, epidemic cerebro-spinal meningitis, erysipelas, measles, mumps, trachoma, whooping cough and tuberculosis.

The second measure therefore, is school exclusion, both of those with communicable disease and of all contacts and occupants of infected houses for such a length of time as in the judgment of the authorities will ensure the safety of the other pupils and prevent the spread of the infection.

The third measure to promote the health of school children is the thorough disinfection of the homes and persons of the patients and contacts by a competent health officer.

The fourth measure is the disinfection of the school itself, which should include desks, books, slates and all other furniture, fixed or portable.

The fifth measure is the systematic inspection of school children by a physician, supplemented in all large towns by the services of a school nurse, and, where necessary and practicable, by the skill of an expert in the diagnosis of tuberculosis.

'Such a system,' declared Dr. Dixon, 'successfully inaugurated throughout the length and breadth of our continent would, I am confident, soon make itself evident in a noticeable narrowing of the broad swath annually cut through the columns of our school children by communicable diseases."

Harrisburg, April 16.

"The medical inspection of rural district schools in the three counties of Dauphin, Cumberland and Lancaster has been completed. This work will form a basis for the examination of school children in the rural districts throughout the entire State.

Fourteen thousand four hundred and thirty-four children were examined in 572 schools. Of the total number, 2,830 children presented one or more physical defects tending to handicap them in their school work. Two thousand two hundred and fifty-eight children showed defective vision; 292 defective hearing; 342 defective nasal breathing and 55 children presented conditions which would lead the Inspector to suspect the existence of tuberculosis. These totals for work done in but three counties of the State show the scope of the task which the State Department of Health has set before it and also confirm Dr. Dixon's realization of the need of Medical Inspection of schools in Pennsylvania.

Eleven Inspectors in Dauphin, 9 in Cumberland and 35 in Lancaster made the examinations in these three counties, from one to three townships being assigned to each physician. The Inspectors also made a thorough investigation of the sanitary conditions existing at the schools.

In his report to the Department the Medical Inspector notes the age and sex of the pupil, the condition of sight, hearing, respiration, skin, teeth, cervical glands, contagious diseases, pulmonary tuberculosis and deformities. In recording the deformities they are classified as those of the spine, the chest and the extremities. Those of the extremities are further described as congenital or acquired.

Each eye is tested separately, using Snellen's Chart at twenty feet, indicating the amount of vision as a fraction, the distance at which the child is standing, namely twenty feet being used as the denominator and the numerator being the size of the type which the child is able to read at that distance. The presence of blepharitis, conjunctivitis, iritis or trachoma or any affection of the cornea is then noted. Care is taken that the children do not memorize the letters.

Each ear is likewise tested separately for accuracy of hearing by whispering at twenty feet, the distance at which the whisper is heard being used as the numerator and the distance at which it should be heard being given as the denominator of the fraction.

The presence of a discharge from either ear is then noted, and its nature.

Defective teeth and nasal breathing are noted. Enlargement of the cervical glands is observed. With regard to nervous conditions the existence of chorea or epilepsy is stated and the general condition of nutrition.

If indications of present or recent contagious disease are found note is made of the fact and the exclusion of the child and its brothers and sisters at once ordered.

Gentleness and tact are employed in the personal inspection so that its value may not be impaired by mental disturbance on the part of the child.

Under no circumstances does the Medical Inspector advise as to the selection of a physician or communicate with the family of a pupil personally with regard to the results of the examination, all reports to the family being made directly from the Department.

Upon receiving the reports at the central bureau in Harrisburg, the Chief Medical Inspector and his assistants go over them very carefully and letters are written to the parents of children in whom physical defects have been found, calling attention to these defects and suggesting that the child be taken to the family physician for a more detailed examination and treatment.

Harrisburg, May 10.

Three hundred thousand girls and boys in the third and fourth class school districts of Pennsylvania are to be safeguarded from undiscovered ills which menace their health and general well being.

All the preliminary arrangements for the work of medical inspection have been completed by the Commissioner of Health and during the coming week the actual work will begin throughout the 321 boroughs and 460 townships which are to receive the benefit of the act of Assembly authorizing this protective measure.

It will take the 500 physicians who will be appointed the task about two weeks to complete the work in the field. When this is done all the reports will be sent to the Department of Health where they will be studied carefully and wherever a record is found of a child who is deficient in sight, hearing or otherwise in need of attention the parents will be notified by the Commissioner. In no instance will the Doctor making the inspection communicate with the parents directly. This will be done by Dr. Dixon through the teachers, who will receive a duplicate report which they are required to keep until the end of the school year.

The first step in the examination of the pupils will be an identification record giving the name of the teacher, location of the school, age, sex, color and nativity of the pupil, all of which will be entered on a card. The examination will be made in the school room and when they so desire the parents or guardian may be present. The pupil's vision will be tested by the use of Snellen's chart and the degree of impairment if any noted. This will be followed by hearing tests, breathing tests and an examination of the cervical glands. Skin diseases, nervous disorders, quarantinable diseases, deformities and the general nutrition of the child all are to be considered.

In making the examination no clothing will be removed and in looking at the teeth and tonsils the physician will use a separate, new, wooden tongue depressor for each pupil.

In addition to the examination of the pupils the medical inspector will make a thorough report on the sanitary conditions of the school and its surroundings. This will be most complete as to details. The condition of the rooms and halls will be noted and the method of cleaning giving. The amount of lighting space in proportion to the floor area will be computed as well as the number of cubic feet of air space per pupil. The method of heating, whether steam, hot water or stove and the location of the apparatus. The water supply, a most important point, is to be given attention, if from a well, its location and the possibilities of contamination from surface drainage or adjacent cesspools, stables, etc., must be noted. If it is from a municipal supply, whether from within the building on the grounds and the possible source of contamination, if any. The care of the water in the school room is also a subject for examination and such points as whether the drinking cups are dipped into the bucket, the use of individual cups, the cleaning of the receptacle used and the frequency with which it is replenished are all noted. While all of these things may seem to many of the parents matters of trifling importance their value in protecting the health of their children is of the greatest consequence.

Wherever medical inspection of schools has been instituted within this State or other Commonwealths, its value has been so thoroughly demonstrated and the results have proved of such aid to thousands of children that it has never in a single instance been discontinued. The parents are in almost every instance quick to take the remedial measures necessary to give their children an equal chance with their fellows and little Johnny who has already seemed a dullard or Mary who has lagged behind her playmates may with the proper attention to some heretofore unsuspected defect of sight or hearing, prove themselves the brightest of a class of which they were previously dull members.

"Harrisburg, Pa., May 15.

"A big factor in the development of tuberculosis among our people is the weakening of our children's general physical condition by driving them to overstudy," said the Commissioner today.

"I every day see children who will never live to grow up, and who are being sacrificed to the vanity of their parents, because their children having active brains stand high in their classes; and their fathers or more often perhaps their mothers, are flattered at finding that their own children are out-stripping those of their neighbors in their studies.

Only today I saw a poor anemic little fellow in a physician's office where he had been brought by his father for some trifling surgical injury which indicated feeble nutrition. His countenance showed a high degree of intelligence, but he was pale and anemic in the extreme; his manner was nervous and his expression was one of weariness.

I asked his father if the boy attended the public schools. 'Oh, yes,' he answered, 'and stands at the head of all his classes.' But can't you see, I said, that he is overworking his brain and pining for fresh air? That boy ought to be taken from school at once and made to live in the open until his health is thoroughly established. 'Impossible! exclaimed the father, 'it would break his mother's heart.' Now here was a most promising boy, the idol of his mother's heart, and yet she was jeopardizing his health and life in order to gratify her maternal pride in his attainments.

The fact is that we Americans have been too much in the habit of regarding our children as solid lumps of intellect, and have forgotten that their nature is a two-fold one, that they have bodies as well as minds and that if we would have them grow up to a perfect manhood and womanhood we must educate their dual nature and not one at the expense of the other. The most thoroughly educated nation on the earth is the German. It is also the most robust, showing that it is possible to be well educated and vigorous at the same time. But this because from the cradle the Germans begin the education of the body as well as the mind and the education is carried on symmetrically to maturity, the body having its full due all along. Farmers' children who attend school only six or seven months in the year and walk miles to school every day are better able to stand the cramming process on which the modern pedagogue insists than those who live between city walls.

Every day I see in the street cars young girls carrying complete libraries of educational books and too often their pale cheeks testify that time has been devoted to mastering their contents which might better have been given to open air games. If they should carry half as many books and walk to school instead of riding in crowded cars, their chances for living to vigorous maturity would be greatly improved.

Statistics show that during the middle period of school life a noticeable and rather sudden increase of tuberculosis takes place, and knowing what we do of the physical conditions which predispose to the life of that germ in the human body, that is only what one would naturally expect. Our school laws in this State contain many provisions for the protection of the children, but these are too often overlooked by the teachers and by those who arrange the overloaded curriculums."

Harrisburg, February 20.

"Called in by the local health authorities to assist them, the trained medical inspectors of the State Department of Health have been busy during the past month stamping out epidemics of communicable disease in schools and academies in Pennsylvania.

At one institution it was scarlet fever, at another diphtheria and at still another measles. In every case the same prompt and thorough methods of the Department were employed and with successful results.

In an academy attended by 425 young men, twenty-one went down with scarlet fever, the epidemic starting from one case of a boy who had visited his home in the south during the holidays and had brought back with him the germs of the disease which unfortunately had been incorrectly diagnosed as some minor ailment.

When the Medical Inspector detailed by the Health Commissioner took charge of this situation he found that practically all the students had been exposed to the contagion. They were all therefore put under quarantine and held until the incubation period was passed. Then each boy who had not developed the disease was given a disinfecting bath, his clothing was thoroughly fumigated and with the consent of the parents and the local board of health of his home town, he was permitted to go home. A letter was sent at the same time suggesting to the health authorities of the boy's town the advisability of keeping an eye on the contact's condition for ten days longer. This thoroughness in handling these cases was greatly appreciated by the school authorities, and by the local health boards as well as by the parents of the students.

Practically the same methods were pursued in another school where measles had broken out. The extent of the precaution observed by the State health officials in handling this most contagious disease was shown when one of the boys, who had been exposed to the disease, but who gave the history of a previous case of measles in childhood, wanted to join his parents in Jacksonville, Florida. The boy's clothing was disinfected, he was obliged to travel in a separate drawing room car and only after the health authorities of Jacksonville had given their consent to his coming.

"It is only by such careful methods" declares Doctor Dixon, "that we can ever hope to combat measles, which is so wrongly looked upon as a trivial ailment."

In still another case during the past few days the State Department of Health has been called upon to fight a diphtheria epidemic in an Orphan School in one of the interior counties of the State. Here in addition to the usual quarantine and isolation methods, the State inspector rendered valuable aid by personally directing the administration of antitoxin. Nearly two hundred of the children were immunized against the dread diphtheria by the use of this life saving serum. State aid never seems more beneficent than when it stands between the fresh young life of a child and death by a preventable disease.

Harrisburg, Pa., Feb. 22nd.

"State Health Officials have been working day and night to check the outbreak of Scarlet Fever among the students of Mercersburg Academy. This morning 200 of the students who have been under quarantine as contacts will be prepared to go home. All of the students and the faculty as well as the servants have had their throats examined within the past twenty four hours and none of these students present any of the symptoms of the disease. These students will be given a disinfecting bath, put on clean clothing and be allowed to leave Mercersburg as rapidly as possible. Such baggage as they are allowed to take away with them will have been previously disinfected. Those who live nearest the school will be sent first and those who live at considerable distance, where it will take a day or more to reach their homes, will be given another examination before they leave, in order that there may be no possibility of their carrying infection with them. Each student that leaves the Academy will be given a certificate which will allow him to go upon the trains and which will state that so far as can be determined he is free from the disease.

Pennsylvania
Health Bulletin

No. 38. HARRISBURG, PA. SEPTEMBER, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

MODERN MEDICINE AND THE PHYSICIAN.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 38. HARRISBURG, PA. SEPTEMBER 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

MODERN MEDICINE AND THE PHYSICIAN.

Early in the month of August, of the present year, a case of smallpox was discovered in the Polish district, of the city of Pittsburgh. Its origin could not be traced, but there was reason to suspect, that it was introduced from a smallpox infected immigrant ship, which arrived shortly before at Philadelphia. The disease proved to be of a malignant type, thus sustaining the predictions of sanitarians, who forsaw that the mild type which had prevailed for the last ten years could not continue. The mortality was about 33 per cent. The disease spread to different sections of the city, notwithstanding all the efforts of the authorities to control it by strict quarantine, and early in September it began to make its appearance in out-lying townships in Allegheny County. Up to this time 1,000 cases had been treated in hospitals, and new cases were daily occurring. The State Commissioner of Health therefore considered the situation so serious as to demand a special effort to stimulate the vigilance of the Health Authorities and disseminate information among the public and the School Board, as to the importance of vaccination—and revaccination—to protect themselves, and the community against a general epidemic. After consultation with the State and local health officials, and physicians of Allegheny County, he issued an order to the State Health Officers of Allegheny County, to meet him in conference at Pittsburgh on the afternoon of October 22nd, 1912, at the Auditorium of the Chamber of Commerce, and extended an invitation to representatives of the Health Boards and School Boards of Allegheny County, to attend a Public Meeting immediately following this Conference.

In taking the chair at this meeting, which was very fully attended, the Commissioner thus addressed the Health Officers:

"Gentlemen:—

"Permit me to call to your attention to the fact that unless health laws of this Commonwealth, made by the people, are rigidly enforced, we shall be estopped from accrediting freedom to our representative form of government, for no one would consider for one moment that we enjoyed personal freedom if the police laws of the State did not protect us from coming in contact with scarlet fever and other communicable diseases, whenever we left our homes, or mingled with others in public places.

"The laws of the State provide for such protection and it is up to us as officers under oath, to protect the people within our own districts from innocent contact with such diseases. The organic laws of the State, which govern all municipalities alike, provide certain duties to be performed by the health authorities, by physicians, school authorities, undertakers, sextons, and by the people at large in order to prevent a spread of communicable disease. The first and most important duty is imposed upon physicians, requiring them to report forthwith, in writing to the health authorities all cases of communicable disease, which they shall treat or examine. This report is the foundation upon which must be built the successful adminstration of these protective laws, and from which must be compiled all useful morbidity statistics. Every protective measure and every restriction further provided by law rests upon and follows this provision. The health authorities, having received the report of the physician, are thereupon required to establish quarantine restrictions, to place a placard in a conspicuous place upon residences, that all may have warning of the existing danger; to prevent ingress and egress on the affected premises, by means of guards, if necessary, and to perform disinfection after all of the cases in any house have fully recovered. Health authorities are also required to notify school teachers and Sunday School Superintendents of the presence of contagious disease in any household, where there are school children in the family, and the law thereupon imposes upon the school teacher, the duty of excluding children suffering from, or who have been exposed to the disease, from the schools until the proper certificate provided for by the law is presented.

"Duties are also imposed upon undertakers and sextons in caring for the bodies of persons who have died of contagious disease, and in the manner of conducting funerals and interments. Nobody may be buried in any cemetery until a burial permit has been presented to the sexton. It is his duty to see that this permit is delivered. The permit cannot be secured until the proper death certificate has been filed with the local registrar. This death certificate must contain the cause of death under the signature of the attending physician, or the Coronor, must be in part filled out and signed by the undertaker and is notice to him of the nature of the disease from which the person died.

"Local health authorities are required to report weekly to the State Department of Health a list of all cases of communicable disease occurring within their particular municipality, which report is practically a copy of the invidual reports which the law requires the physicians to make to them.

"Superintendents and persons in charge of hospitals, asylums and other institutions situated in townships of the second class, are also required to make similar reports to the State Department of Health, of all cases of communicable disease occurring in their institutions, giving in addition the date of the admission of the patient and of the locality from which he or she was admitted.

"The laws require all persons to obey the quarantine restrictions imposed by health authorities and further especially require that they refrain from entering any hired vehicle or public conveyance, or from willfully exposing themselves on any street, or other public place. The law further provides, that no person shall sell, or dispose of any clothing or bedding, or other articles, which have been exposed to infection, or rent any room or house, or part of a house in which there has been a person suffering from a contagious disease without such articles or rooms have first been disinfected.

"In order that there may be a means of enforcing the provisions of these laws they provide penalties for their violation on the part of physicians, undertakers, school teachers, sextons, or any other person or persons.

"In order that we, to whom their adminstration has been entrusted, may successfully perform our sworn obligations it is necessary to have the full co-operation of the medical profession, the educators, undertakers and of the public.

"The co-operation of the physicians is most necessary because of the importance of the initial report, without which quarantine restrictions may not be promptly established and the nucleus of an epidemic may be initiated in a community before the Health Authorities are aware of the presence of the disease. The moral support of the physician, in addition to formal compliance with the law is essential because of the very extensive influence which he exerts in the community. The people may or may not be familiar with the law; they may or may not be inclined to obey the orders of the health authorities; but they do know and will obey their physician.

"Our educators in the public schools can reach and influence the children, and through them the parents. No more valuable lessons than the simple principles of preventive medicine, which even children can understand and practice, can be taught in our school rooms. All law-abiding citizens by giving their support to their health authorities, and by cheerful obedience to the health laws may by the force of their example help to overcome the prejudices of those who do not understand the value of these laws, and may materially aid us in the enforcement of their provisions.

"It is not only necessary that professional men and citizens generally should co-operate with their individual health boards; it is even more vital that health authorities should work in harmony with each other. They must be equally vigilant in carrying out the provisions of the law. Every city, borough and first class township should have health ordinances which at least comprehend every provision of the Acts of Assembly. All local health boards must require the reporting of all of the diseases enumerated in section one, of the Act of 1909. and must quarantine and disinfect for all of the diseases mentioned in section two of that act.

"Cities, boroughs and townships are closely associated with one another, and lack of uniformity in quarantine restrictions is noticed by the people and naturally they do not understand why a state law should be enforced in one locality of the State and not in another. Local Boards of Health must work with the State Department of Health towards securing state wide uniformity in the enforcement of the Act of May 14, 1909 and in the adminstration of every local provision for the protection of the lives and health of the people."

In the evening of the same day a Symposium on smallpox was called in the rooms of the Allegheny County Medical Society under the auspices of the Pittsburgh Academy of Medicine, to which were invited the Commissioner and Medical Officers of the State Department of Health, the members of the Allegheny County Medical Society, the members of the Pittsburgh Department of Health and physicians of Allegheny County outside of Pittsburgh.

The Symposium was presided over by Dr. Otto Carl Gaub, the President of the Pittsburgh Academy of Medicine. On that occasion the Commissioner delivered the following address:

MODERN MEDICINE AND THE PHYSICIAN.

"Members of the Medical Associations of Pittsburgh,—Ladies and Gentlemen:—

"It is always a great pleasure to meet those of our noble profesion who are most often called upon to care for those who are already ill. The late call for medical assistance is often due to the want of knowledge on the part of the patient of the recent advanced strides in preventive medicine.

"This behooves us to stop and reflect upon this unfortunate state of the public mind. It is partly due to defects in our school system of educttion and possibly also to the fact that we physicians do not realize that it is our duty to write and speak more often than we do to the lay public on hygiene. We too frequently content ourselves by attending meetings and conventions of our own colleagues. Possibly members of our profession who are devoting their lives to privato practice, fear that they might be misjudged by their brother physicians should they write for magazines and newspapers on medical subjects—therefore, the deplorable ignorance and superstitions of those who have never entered the realms of our profession. We should, however, rise so far above any such suspicion that there would be no risk of being misjudged.

"Our life in medicine is one of great sacrifice of health and freedom. Our work is of such a character that money cannot fully compensate us—the glory of our day's work in relieving man in all circles of life from suffering, must be our greatest compensation.

"It is in *our* power, now that preventive medicine has become a science, to teach our patients how to avoid communicable diseases by writing and speaking to the laity on preventive measures; we must not wait until called by those in the throes of pain, but we must *seek* to teach our fellow-man how to escape from the causes of disease.

"I know it is discouraging, but not half so much as it was 25 years ago. The more intelligent are already seeking our advice how to keep well.

"We aro fast approaching the position the ministers hold with their congregations. For all time the teachers of religion have ministered to prevent sin. Members of the legal profession are retained by individuals and corporations to direct them how to proceed to keep out of trouble. It seems to me that the day is upon the members of the Medical profession when their teaching must place us in the enviable position of the clerical and legal profession. The sooner we return part way to the position of the honored and trusted family physician the better for the public and ourselves. We must gain the absolute confidence of our patients and convince them that the preventable disease should rarely enter their homes. We should assist our patients to build up their bodies that they may be impregnable fortresses against the germs of disease.

"Take tuberculosis for example. If that watchful germ, the tubercle bacillus, can find an individual in a family whose life defences have been weakened by over-work, under-feeding, long continued anxiety, a previous attack of measles, or habitually breathing, an impure and vitiated atmosphere, it finds in his or her lungs a suitable soil for its reception and rapid growth, while other members of the same family fortified by better food, wholesome occupation, and frequent excursions into the open air promptly reject the intruder.

"The public is slowly awakening to what can be avoided; already individuals and corporations, who are contemplating moving their homes or industrial establishments, write the Department of Health as to the relative healthfullness of municipalities. In the latter case you see the Golden Bull has gotten into the traces. It is said that money makes the mare go. Therefore, we shall see preventive medicine go apace. The heads of commerce are beginning to acknowledge that conservation of health will reduce the cost of living by increasing the production of labor of all sorts. To assist the medical profession to better serve their patients, the Department of Health of the State of Pennsylvania, and those in large cities are furnishing laboratory diagnosis free. They will furnish preventive antitoxins and viruses for those who cannot afford to purchase them.

"The State is relieving us of the treatment of the poor suffering from tuberculosis and removing thousands from contact with the well.

"Never in the history of the world has a harder battle been fought than is today being directed by the Department of Health and the Medical Profession in this great Commonwealth of Pennsylvania.

"Such educational work must be accomplished through methods of *publicity* and such methods are as numerous as the ingenuity of the public health officer may devise.

"The greatest work that can be accomplished in this, our representative form of Government, is the raising of the standards at once of the health and morals of our people. To this end, we members of the Medical Profession, can do much by precept and teaching. Fellows! do not misunderstand. I am not an idealist—I am, however, afraid of specialization, in fact, extremes of any kind, and I do believe that we can all live happier with the pendulum swinging within the limits of moderation. It is, therefore, up to our Medical Societies to stand firm on a strict professional basis and discourage any of our members from drifting toward the extreme commercialism that exists in the world today.

"We must encourage our members to set a high professional standard and encourage respect for the laws of our people. The law is the keystone of our great republic. The enforcement of a bad law, if there be such, is the best way to have it corrected.

"Just now Allegheny County is suffering from a deadly epidemic of smallpox. Why? Partly because the teachers and School Directors are not yet enforcing the vaccination laws in every case. In conversation the other day with Dr. His, President of the German Association of 'Study-travel,' he told me that in consequence of the enforcement of the vaccination laws of the Prussian-Empire that country which for a hundred years was a charnel house, from whence the lamentations of the bereaved rose continually to heaven, smallpox among the citizens is almost unknown, that they had done away with smallpox hospitals. In a representative form of Government, we cannot make and enforce laws far in advance of the intelligence of our people. In 1905, when I was made Commissioner of Health, I looked around to learn what was my first duty. The wide-spread smallpox epidemic stood out against the horizon. The law to protect the public from the ravages of the disease was studied and reprints of that law were sent to all school teachers and Directors with a circular letter requesting them to obey the law.

"In the infected centers, general vaccination was continued, as before the creation of the new Department, until the epidemic was overcome. The well intentioned anti-vaccinationists were aroused by my having awakened the law abiding school teachers to the meaning of the Act of Assembly and the requiring of the enforcement of the same. An effort was made to have the law repealed and anti-vaccination literature and lecturers were sent through the State which excited the ignorant, but good and credulous people to become hysterical and threaten my life, and in at least one case made an attempt to assassinate me. A few lines to the would-be assassin soon convinced him of his misunderstanding of the subject and of my purpose. He is today happy in the fact that he failed to blot his family escutcheon, which meant much to his seven children. Today things are much better; some of our people are again beginning to realize the value of vaccination for smallpox, as they did a century ago. Antitoxin for diphtheria and the wonderful results we are obtaining from the use of biological products in many diseases which had baffled the medical profession for so many years, must convince the few who are opposing the practice.

"Singular it is that immunization for smallpox by a modified virus is opposed by some of the same people who are pleading for many of the other preventive biological products. This must eventually entirely overcome the prejudice against the use of Jenner's great discovery.

"Dr. Edward Jenner published his discovery of vaccination in 1798. Before the days of vaccination smallpox, as we all know, was a dread scourge. This terrible malady was as common in those days as measles is now; but few reached adult life without having suffered its effects. Lord McCauley, in writing of the death of Queen Mary from smallpox in 1694, thus described the ravages of the pestilence; 'The disease, over which science has since achieved a succession of glorious and beneficent victories was the most terrible of *all the ministers of death.*'

"It was estimated that over 400,000 persons died in Europe each year from smallpox. Today by the systematic use of virus, not a German citizen died during the past year in the great Prussian Empire. In 1907, the faculties of each of the following institutions in the City of Philadelphia, passed resolutions confirming their belief in efficacy of vaccination: University of Pennsylvania, the Hahnemann Medical College, Jefferson Medical College, the Medico-Chirurgical College and the Woman's College.

"The United States Government in 1905 performed the enormous number of 3,094,635 vaccinations in the Philippine Islands, and stamped out the disease. Before this wholesale vaccination, more than 6,000 deaths occurred annually. Having been a member of the Board of Education in Philadelphia, I have followed up their work with much interest. In 1907 their records showed that out of 200,000 children attending public schools only 35 remained away from school, because of the enforcement of the vaccination law. I wish this condition prevailed all over the State.

"Sometime ago I received a letter from Dr. S. Weir Mitchell, enclosing one from General Leonard Wood, which since has been filed in the Philadelphia College of Physicians. The following is an abstract from the letter:—'The disease (smallpox) in Cuba has assumed an epidemic form, there being about 4,000 cases, with some 30 deaths a day. The effect of general vaccination seemed to be to instantly check the epidemic as though it had been swept from the district.'

"The crowning feature of all, proving the efficiency of vaccination was the fact that the entire regiment of Second U. S. Volunteers, all vaccinated, encamped in the town afflicted, without a single case developing. With all this history, which is only a line out of what has been recorded, on the results of the use of the greatest prophylactic ever discovered, we must ask ourselves why the presence of this malignant type here today? It is due to a lack of general education on this subject, a disposition of the people to believe they are above law, and partly to our want of vigilance.

"When we depended upon the human child to get our virus the accoucheur never dismissed his patient until he had vaccinated and obtained the scab of the newborn. Now when the great biological laboratories have at all times, a fresh virus to furnish at a moment's notice, I fear we have grown too careless about the new born. Often upon the least objection from the mother we permit the child to take the chances of contracting smallpox and furnish infection enough for a wide-spread epidemic.

"When we are in the throes of an epidemic, we are pretty well occupied in the work necessary to conquer it and as vaccination is the preventive measure adopted by all nations without which the armies and navies would be an easy prey for an enemy, our difficult task is to discover the origin, to find the contacts and to educate the public that they are individually taking their lives in their own hands by not being vaccinated. We must try at all times to bring about a general vaccination so as to make a general epidemic of the disease impossible.

"To this end, in behalf of our people, I request you to try and teach all our profession to go hand in hand with the much abused health officer to educate the people and to be prompt in reporting chicken pox as well as smallpox, for, as we all know, many epidemics have been originated by mistaking the latter for the former."

HEALTH BULLETIN SCHEDULE.

No.	Issue.	Subject.
1.	July, 1909,	Disease-Breeding Power of House-flies and Methods of Prevention.
2.	Aug., 1909,	Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, etc.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be Avoided in the Daily Fight against Tuberculosis.
8.	Feb., 1910,	Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Penna. The Results of Four Years' Work of the Department.
10.	April, 1910,	Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptability to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly, How it Develops, why it must be Destroyed and how to Destroy it.
24.	June, 1911,	Effects of Tubercle Products on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Penna. State Dept. of Health.
27.	Sept., 1911,	Tuberculosis in the Country as well as in the City, A Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biologic Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from, etc.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects.
33.	Mar., 1912,	The Opportunities for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.

No.	Issue.	Subject.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912.	
41.	Dec., 1912.	
42.	Jan., 1913.	
43.	Feb., 1913.	
44.	Mar., 1913.	
45.	April, 1913.	
46.	May, 1913.	
47.	June, 1913.	
48.	July, 1913.	
49.	Aug., 1913.	
50.	Sept., 1913.	
51.	Oct., 1913.	
52.	Nov., 1913.	
53.	Dec., 1913.	
54.	Jan., 1914.	
55.	Feb., 1914.	
56.	Mar., 1914.	
57.	April, 1914.	
58.	May, 1914.	
59.	June, 1913.	
60.	July, 1914.	
61.	Aug., 1914.	
62.	Sept., 1914.	
63.	Oct., 1914.	
64.	Nov., 1914.	
65.	Dec., 1914.	
66.	Jan., 1915.	
67.	Feb., 1915.	
68.	Mar., 1915.	
69.	April, 1915.	
70.	May, 1915.	
71.	June, 1915.	
72.	July, 1915.	
73.	Aug., 1915.	
74.	Sept., 1915.	
75.	Oct., 1915.	
76.	Nov., 1915.	
77.	Dec. 1915.	

Pennsylvania Health Bulletin

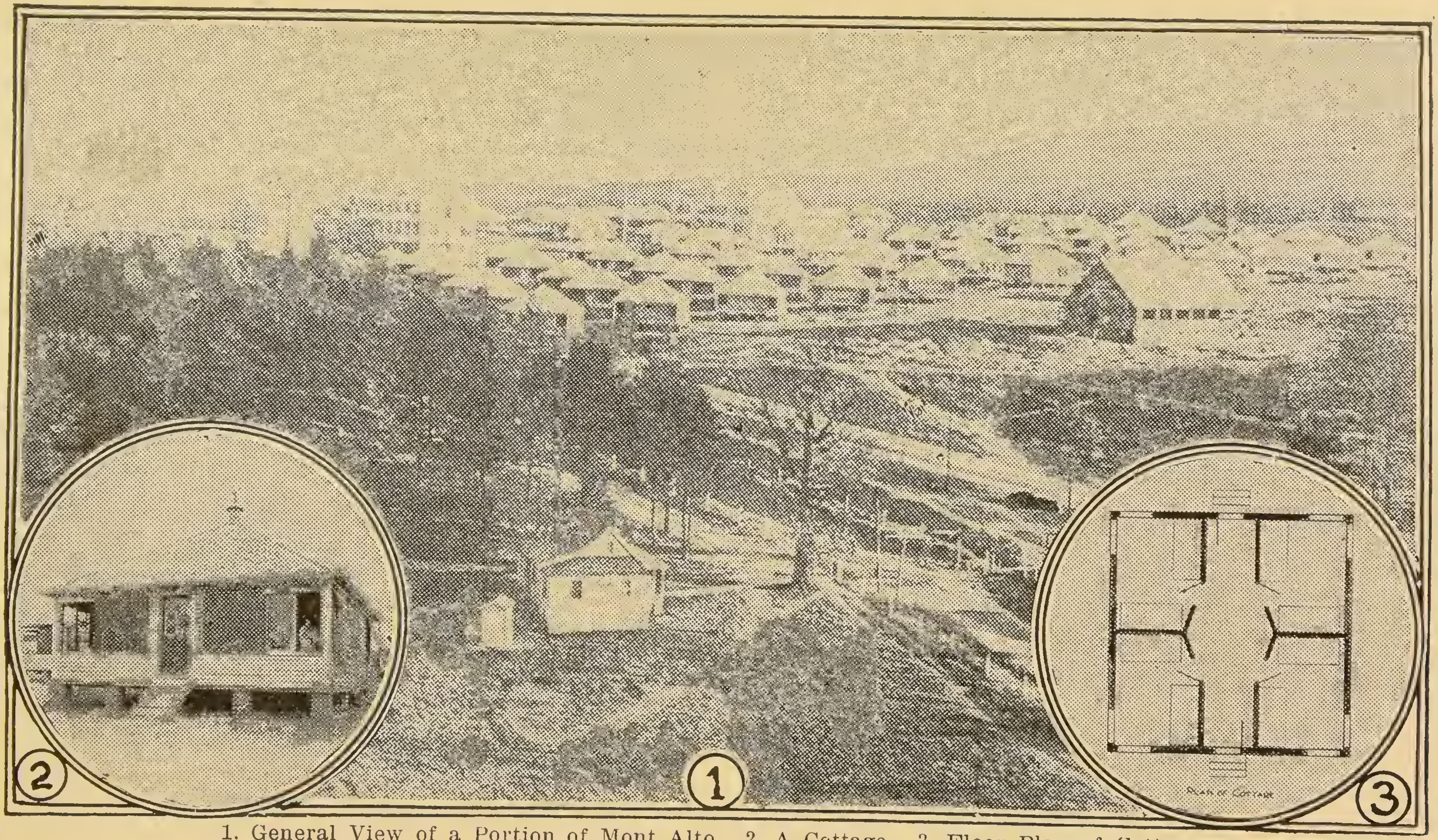
No. 39 HARRISBURG, PA. OCTOBER, 1912.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

BATTLING FOR HEALTH AT MONT ALTO.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1912.



1. General View of a Portion of Mont Alto. 2. A Cottage. 3. Floor Plan of Cottage.

Pennsylvania
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

No. 39. HARRISBURG, PA. October, 1912.

Entered as Second-Class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

BATTLING FOR HEALTH AT MONT ALTO.

One thousand citizens of Pennsylvania are camped on the slopes of South Mountain, Franklin County, fighting for their lives. There is no ebb and flow in the tide of battle, which goes on from day to day;—the regiment is made up of men, women and children, each of whom is waging his or her fight for health and strength against death's ally, Tuberculosis.

Here for five years, under the direction of Samuel G. Dixon, Commissioner of Health, the State has cared for its indigent consumptives. In that time the institution has grown from a mere out-post, a handful of patients and a few doctors and nurses, into the world's largest Tuberculosis Sanatorium with one thousand patients and a staff of nearly two hundred.

Thanks to the wise generosity of the State and the ability and energy of the executive in charge, the Pennsylvania State South Mountain Sanatorium, or as it is commonly called, the Mont Alto Sanatorium, has become an enduring monument.

It is located in the heart of the State Forestry Reservation of fifty-five thousand acres, six hundred of which have been set aside for the use of the institution.

Early in the fifties, near the site of this hill-side city, there stood a tavern that was famous thru all the surrounding country as a salubrious spot where sufferers from asthma, hay-fever and kindred afflictions, found great relief. For more than a decade prior to the conflict between the North and South, this hostlery with its stables, servants' quarters, bowling alley and dance hall, was the popular resort for the planters from Maryland and Virginia. After the outbreak of the hostilities, every highway and by way was crossed and recrossed by the soldiers of both armies and the Cold Springs Hotel was burned by forces en route to the field of Gettysburg.

The end of the war brought no revival of South Mountain's popularity as a resort, the old patrons were scattered and their slaves and fortunes swept away by the great tide of war, and all that remained of the gay little resort, were the crumbling foundations.

The reputation of this locality as a favorable spot for those afflicted with diseases of the lungs remained however and here and there on the mountain was to be found the cabin of some sufferer, who had heard of the benefits to be derived from residence on its pine clap slopes. It had a reputation as a place of healing, a mountain of hope for those who suffered from illnesses of the lungs and throat.

When the Department of Health was created in 1905 and Dr. Samuel G. Dixon, the newly appointed commissioner, inaugurated a campaign against tuberculosis, there was a little band of patients on the Forestry Reserve. Dr. J. T. Rothrock, then Forestry Commissioner, had taken the broad view that the State Forest Reserves might be put to good use as sites for camps for sufferers from Tuberculosis.

In 1905 the Legislature had appropriated ten thousand dollars to enlarge the camp on South Mountain. The patients however, were expected to furnish their own food; the Commonwealth provided shelter and medical attendance to about twenty patients.

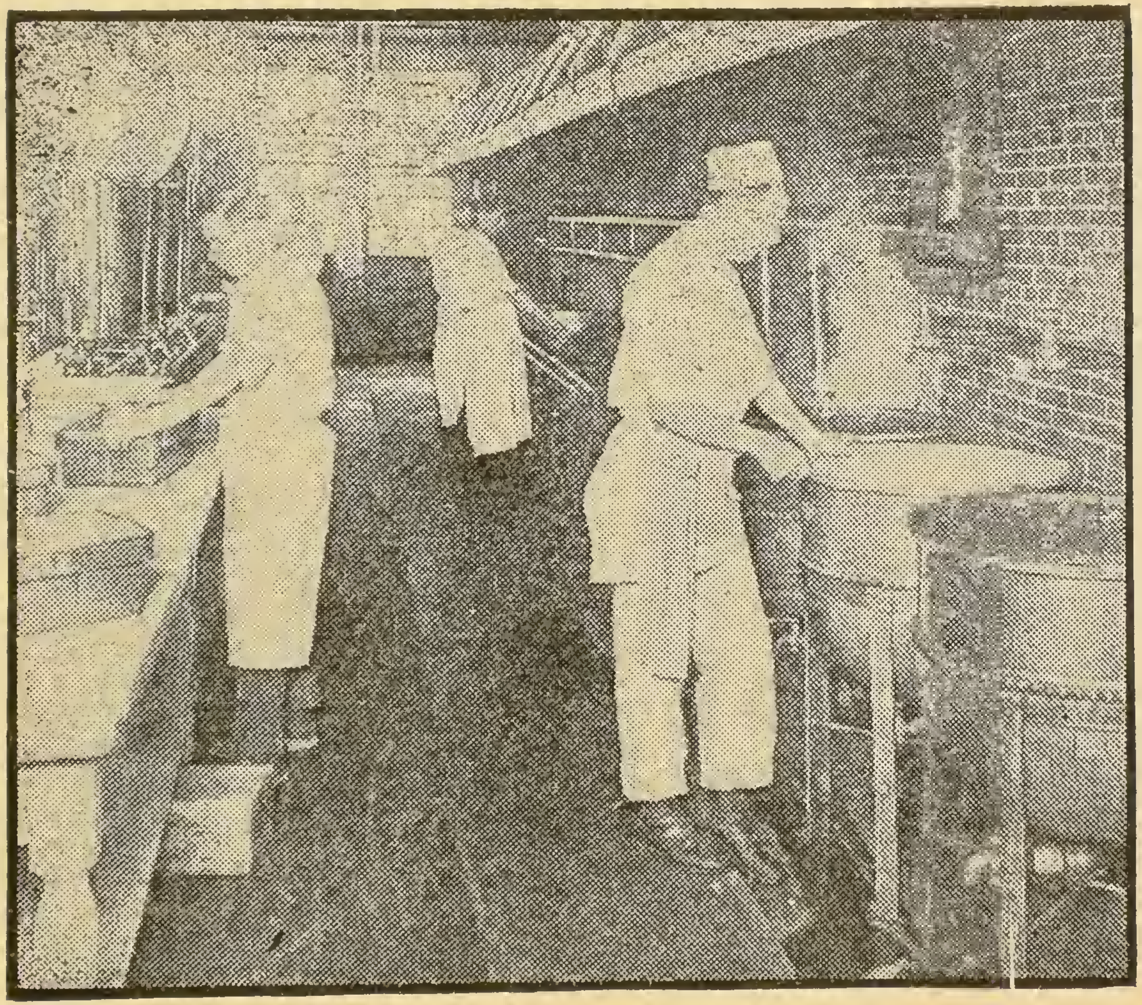
In 1907 the Legislature authorized the turning over of this camp and reserve of six hundred acres to the Commissioner of Health. Within a few days after the transfer, plans were made to provide additional accommodations. Tents were obtained from the Adjutant-General and within a short time the capacity of the camp was increased to one hundred and forty patients. At the same time plans were prepared for building upon this site a great Sanatorium.

In the five years which have elapsed, the institution has steadily expanded. The capacity has been kept at its maximum thru out the period of construction, each additinal building being filled as soon as finished.

The doctors and nurses of the staff subjected themselves to every inconvenience that additional patients might be cared for and it was not until recently that the staff was comfortably housed.

The Institution City is made up of the following buildings: The dining-room building, general hospital, administration building, children's building, seventy cottages, sixteen pavilions, fifteen tents,

Weighing the Patients.



Main Kitchen.

Mountain Road Near Sanitorium.

Distributing Mail.

A Cottage Bedroom.

One of the Sunday Services in the Union Chapel.

"Taking Cure."

Cottage Dressing Room.

four bath houses, a chapel, laundry and power house, nurses home, doctor's home, medical director's house and infirmary. The latter is a quarter of a mile distant from the camp and has a bed capacity of two hundred. Here the more advanced cases receive care.

The seventy trim cottages that center about the administrative and service buildings, are novel in design. These cottages were constructed after plans prepared by Dr. Dixon.

They are 27' square, roofed and sided with asbestos shingles and raised several feet from the ground on concrete piers. Between the piers are swinging sections, which maybe raised in fair weather to allow a current of air to pass underneath the cottages.

The cottages are set with their corners on the points of the compass, which insures the maximum of sunlight to each of the four rooms into which they are divided. Their arrangement on the streets is such that the free circulation of air between them is never hindered.

Thru the center of each cottage is a hall-way widening in the middle to give ample space for a radiator and water heater. This arrangement gives the cottagers a warm handy dressing-room. Each of the four rooms has two enormous windows which are open day and night. There is a sliding shutter that maybe raised after the fashion of a Venetian blind, to afford protection during the violent storms without lessening to any degree the supply of pure air in the room.

The rooms are 11 x 13, and are cozily furnished for two occupants with neat iron beds, writing tables, mirrors, clothes chests and wash stands. There are four large bath houses adjacent to the cottages, each equipped with twelve showers and tubs.

The neatly kept cottage streets with their concrete walks edging the green sward all converge on the great dining-room building. This is very suggestive, for let it be known, that dining is no small part of everybody's business at Mont Alto. Good food is as much an essential as fresh air in building up the health of the patients and nothing but the best and most nourishing food is served.

Think of a dining room, 163' long and 38' wide. Six hundred patients can sit down to each meal without the least crowding or inconvenience.

When all the patients are seated at meal times and grace has been said, the chief steward rings a bell and the waitresses roll in the white enameled serving tables with burnished copper containers, where the food is kept at oven temperature until served. A squad of waitresses work from each of these serving tables and within five minutes after the tap of the bell, everyone of the six hundred diners is served with food that is piping hot.

The great kitchen behind the dining hall is a model of its kind. Everything is spotlessly clean and bright. It is scrubbed from end to end after every meal is served. The dining hall too, is scrubbed once a day and the paper table cloths and napkins are laid afresh for each meal.

All servants at the institution are fed in separate dining rooms. The institution chef and his corps of assistants are busy from morning until night preparing food for the small army of patients.

Three times a week there is chicken and ice cream on Sunday and all sorts of good things between times that serve to stimulate the patient's appetite. The more the patients eat the better the doctors are pleased and there is not much difficulty in this respect because the stimulating mountain air is conducive to an appetite as the most casual visitor at Mont Alto can testify.

At 6:30 every morning the rising bell rings, and 7 o'clock the breakfast bell. After breakfast the program for the day runs as follows:

At ten o'clock milk and eggs, twelve o'clock dinner, three o'clock milk and eggs, five o'clock supper and seven o'clock milk and eggs. Milk and eggs three times a day you see for "a piece."

The consumption of milk and eggs is something startling, three thousand a day of the freshest eggs obtainable and 2,100 quarts of milk. The distribution is from the dispensary and at each of the stated hours, the patients form in line with their cups, some bring two or three to get their fellow cottagers' allowance. The nurse stands at the great milk cans and fills the cups, and passes out the eggs to the patients as they troop by.

There are thru out the camp, pavilions open on all sides, where at certain hours, morning and afternoon, all patients are required to "take cure." This consists of resting in comfortable steamer chairs for two hours. The women may crochet and the men read; the essential thing however, is that they spend this time in the open air without any physical exertion.

The men's and women's camps are separated and this division is also carried out in the great main dining room.

As almost everyone knows, rest, fresh air, sunshine, and plenty of wholesome nourishment are the "medicines" used in combating and curing Tuberculosis, and knowing this, one might readily believe that the daily routine at such an institution as Mont Alto might resolve itself into something like the monotonous regularity of Mark Twain's Court Diary which read,

"Monday the King road in the Park.
Tuesday the King rode in the Park.
Wednesday the King rode in the Park.

Thursday the King rode in the Park.
Friday the King rode in the Park.
Saturday the King rode in the Park.
Sunday the King rode in the Park."

This is far from the case however, for while the hours for meals, for "cure" and bed-time never vary, the patients find opportunity for much entertainment and many profitable little occupations are carried on by both men and women.

There are a score of amateur photographers who sell their own post-card views of the camp and surrounding scenic beauties. There is one cottage where the patients have turned their hands to carving walking sticks, handkerchief-boxes, etc. Many of the women make beautiful Irish Crochet lace and similar articles of handicraft. There are two shoe makers in the camp who ply their trade among the patients, several tailors and barbers.

Much of the light work around the institution is performed by the patients. All the sputum boxes used in the institution and those given out at the one hundred and fifteen State Tuberculosis Dispensaries are manufactured by patients at Mont Alto.

The work of caring for the enormous chicken yards is all attended to by the patients as well as many of the small tasks, such as painting, gardening, etc. However, they are not allowed to perform any labor in connection with the preparation or serving of the food stuffs at the institution. All the kitchen and dining room service is performed by outside help.

The institution has an excellent orchestra made up of patients and directed by one of the medical staff. Three times a week concerts are given at meal hours in the big dining room.

For four years past the patients have published a monthly magazine called "Spunk." During that time the staff has changed as its members gained health and strength to enable them to return to their homes. However the little magazine has not suffered and it is as bright and interesting a publication as one could find anywhere conducted by amateur journalists. From time to time well known writers have contributed to its pages and it boasts of a wide circulation thru out the United States. The last number contains among other things a congratulatory letter from Governor Tener, who says:—

"Spunk stands for a healthy journalistic optimism, it reflects the brightest side of life and strives to bring courage and good cheer to those who need it most,—which is sure to bring success to your magazine and brighter hours to its readers."

On fine days parties of patients are made up and go in charge of a nurse, for walks on the beautiful mountain roads in the vicinity of the institution. The length of these walks is regulated by the condition of the patients as every care is taken that no one shall exert himself sufficiently to become fatigued.

The cheerful attitude of sufferers from Tuberculosis has become proverbial and perhaps the thing which impresses the visitor at Mont Alto most is the optimistic atmosphere, which seems to prevail thru out the whole institution. The doctors and nurses do everything possible to increase this attitude of mind and the results in the majority of cases when taken early enough, are astonishing.

Hundreds of patients have returned to their homes after a few months in the City of Hope, fitted to resume their work-a-day lives and thoroughly educated in the precautions which they should observe to best preserve the health, which they have recovered on the sunny slopes of South Mountain.

P412h

STATE UNIVERSITY LIBRARY
FEB 23 1914

Pennsylvania Health Bulletin

No. 42. HARRISBURG, PA. JANUARY, 1913.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

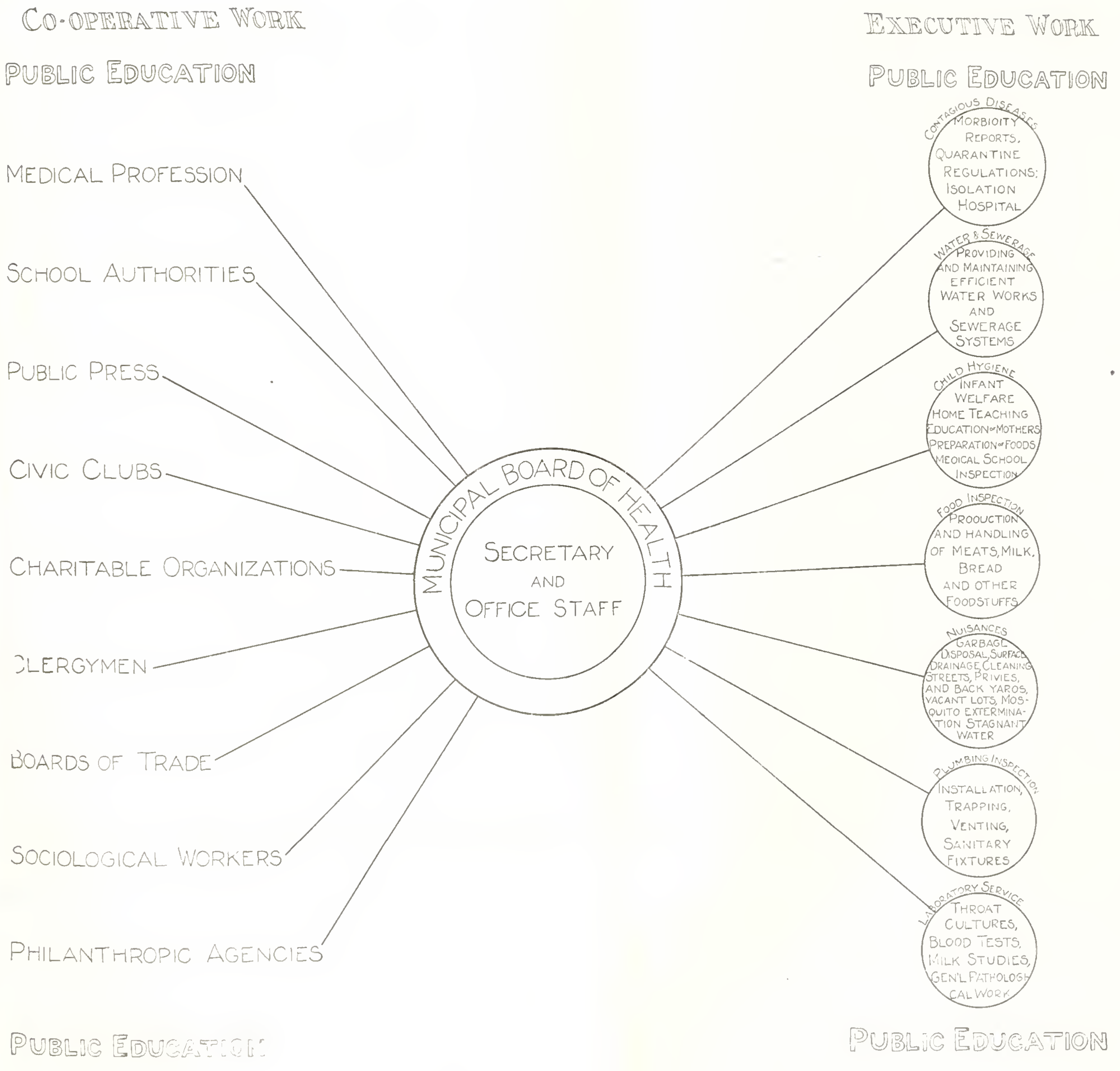
WITHDRAWN

WITHDRAWN

MUNICIPAL SANITATION.

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1913.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
SCHEME FOR
MUNICIPAL PUBLIC HEALTH ORGANIZATION


CO-OPERATIVE WORK
PUBLIC EDUCATION
MEDICAL PROFESSION
SCHOOL AUTHORITIES
PUBLIC PRESS
CIVIC CLUBS
CHARITABLE ORGANIZATIONS
CLERGYMEN
BOARDS OF TRADE
SOCIOLOGICAL WORKERS
PHILANTHROPIC AGENCIES
PUBLIC EDUCATION
MUNICIPAL BOARD OF HEALTH
SECRETARY AND OFFICE STAFF
EXECUTIVE WORK
PUBLIC EDUCATION
CONTAGIOUS DISEASES
MORBIDITY REPORTS, QUARANTINE REGULATIONS; ISOLATION HOSPITAL
WATER & SEWERAGE
PROVIDING AND MAINTAINING EFFICIENT WATER WORKS AND SEWERAGE SYSTEMS
CHILD HYGIENE
INFANT WELFARE
HOME TEACHING
EDUCATION OF MOTHERS
PREPARATION OF FOODS
MEDICAL SCHOOL INSPECTION
FOOD INSPECTION
PRODUCTION AND HANDLING OF MEATS, MILK, BREAD AND OTHER FOODSTUFFS
NUISANCES
GARBAGE DISPOSAL, SURFACE DRAINAGE, CLEANING STREETS, PRIVIES, AND BACK YARDS, VACANT LOTS, MOSQUITO EXTERMINATION, STAGNANT WATER
PLUMBING INSPECTION
INSTALLATION, TRAPPING, VENTING, SANITARY FIXTURES
LABORATORY SERVICE
THROAT CULTURES, BLOOD TESTS, MILK STUDIES, GEN'L PATHOLOGICAL WORK
PUBLIC EDUCATION

Pennsylvania Health Bulletin

No. 42. HARRISBURG, PA. JANUARY, 1913.

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL.D., COMMISSIONER

MUNICIPAL SANITATION.

Historically, the problems of municipal sanitation date back to the period when human beings first began living in settlements for any definite period of time. Originally, man was compelled to observe the elementary laws of hygiene in his quest for food, hence, lived, slept and ate largely in the open air. In his quest for food he naturally learned to shun certain plants as poisonous, and learned to reject discolored water. As soon, however, as he began to live a community life, nature no longer acted as scavenger, and with the modification of natural conditions it became necessary for him to adapt himself to the new surroundings and to practice some simple sanitary procedures. The nomad in camp life soon learned to bury his dead and to bury or to remove to a distance the offal accumulating in the camp. Instead of moving away from these menaces, he removed the menaces from himself. The sanitary codes of many of the earlier peoples, especially among the Hebrews and Hindoos, went into great detail concerning the protection of drinking water, outlined methods to be followed in burying the dead, provided for the protection of food stuffs and included regulations for the control of marriages. It is true that practically all health legislation among these early peoples, whether in Greece or Rome, India or Egypt, or among the Israelites, was a sort of religious teaching and was in some way associated with directions from Heaven. Many of the health precepts of the time were high ideals of moral teaching.

In early Greece and Rome sanitary teaching aimed chiefly at developing fine physical specimens of manhood rather than in protecting man from disease. Aristotle taught that the "art of procuring health is as important to the statesman as the art of procuring subsistence and accommodation, for both alike pertain to economy, political as well as domestic," in some of his teachings expressing regrets that the exigencies of defense render inadvisable sanitary municipal architecture, with wide straight streets for all citizens.

In Rome the Emperors regularly appointed health officers, the duties of these officers affecting very largely the health of the public, the positions commonly being filled by distinguished citizens. Rome's first public water supply was brought into the city by aqueduct, 313 B. C., and by 97 A. D., nine such aqueducts brought into the city to its forty-seven delivery tanks, a sufficient supply of pure water to give each citizen a per capita allowance of thirty-eight gallons. This water supply not only gave the citizens their drinking water but it was also used in flushing the great sewer of the city the Cloaca Maxima. The purity of the water supply even at the beginning of the Christian era was protected by law. Anyone found polluting the springs or aqueducts could be fined 10,000 sestertii. Inspectors in uniform constantly patrolled these aqueducts and the source of supply in the vicinity of the springs, in order to prevent pollution, and there is pretty good evidence to believe that a number of reservoirs or delivery tanks were well covered.

Rome and Carthage, by paving their streets, building sewers and pavements and draining swamps made their cities habitable. Probably it is true that both Carthage and Rome developed their water works, sewers and pavements as a result of demands for physical comfort on the part of the leisure class and because of a growing esthetic sense, and possibly the same reasons prompted the cleansing of the streets.

A later day religion, teaching that pestilences were direct vistiations of God, to be meekly submitted to by the populace, lessened the incentive to sanitary advancement, Europe paying dearly for this teaching and neglect by the ravages of the great epidemics of the years 550, 1000, 1345, 1350, 1485, 1528 and 1665. The death roll reported for black death in the years 1345 and 1350 numbered millions. China is said to have lost at this time 13,000,000, Paris 50,000, London and Venice each 100,000, and it is said that the Franciscan Friars in Germany lost 125,000. Lamjrecht says these epidemics were largely due to filth but the superstition of the people attributed them to direct visitations of God and other causes. The calm submission to Divine wrath on the part of religious enthusiasts with the terrible financial losses upon all classes of society was borne for many years.

Early in the fourteenth century mercantile interests seemed to see the light and to feel that these visitations might be averted by some protective means. The earliest measures of this sort were provided in Italy, most likely in Venice, regulations being provided against the bringing into port of vessels carrying pestilential diseases. In fact, the very name "quarantine" originated from the Italian but was probably not used until a later time. As you know, quarantine comes from the Italian "quaranta," meaning forty, because originally all periods of detention lasted forty days. With the establishment of regulations for the protection against the pestilential diseases, the prevailing theory of providential origin of plagues began to wane and the first sane procedures against filth were started.

Erasmus was among the first to preach this new doctrine, when he rejected the divine origin of the sweating sickness in 1458 to 1518 and attributed it to the unclean habits of the English and the poor ventilation of their houses. More's Utopia, published about this time, "was to be a land where the first consideration was cleanliness and health; slaughtering was to be done outside of towns, as many guild towns had already ordained. No foul or unclean thing was to infect the air by ill smells, while public hospitals were to provide for the isolation of infectious cases." Probably the greatest advance in sanitary procedures made because of this new teaching was that of clearly defining nuisances and to provide for their abatement. Bracton and Grenville, about this time, formulated the principle that "anything is a nuisance which in its consequences must necessarily tend to the prejudices of one's neighbor. For special damage the injured party might bring action, while for danger shared with the public, indictment was the remedy. The damage need not be to the property itself. If the use of the property was rendered disagreeable by the stench from the adjacent property the courts would regard, as a nuisance, the cause of the stench." Blackstone in his day elaborated somewhat the definition of a nuisance so that he mentions as nuisances, "obnoxious animals, offensive trades, corrupting water sources, corrupting the air, whether by positive acts or by omission to abate nuisances." Practically nothing new has been added to the definition of a nuisance since Blackstone and the principle enunciated by him at that time, to "use your own that you will not injure another" is practically a paraphrasing of the Golden Rule.

During the seventeenth and eighteenth centuries, great progress was made in municipal sanitation; in Europe the building of elaborate houses, paving of streets, introduction of water works and the general elaboration of quarantine against epidemic disease was somewhat systematically carried out. During all of these centuries, however, sanitary matters and quarantine remained essentially local and municipal functions. Beginning with the eighteenth century, however, England Belgium, France, Prussia and the United States began recognizing quarantine as a State procedure rather than a purely local concern,—Mon-tesquieu advancing the principle that the State "owes to every citizen a kind of life not incompatible with health." In continental Europe central health boards were organized in the earliest part of the nineteenth century, but in England and in the United States general steps of this sort were not taken until about the middle of the nineteenth century. William H. Allen, in his splendid thesis on sanitary administration in Pennsylvania, from which I have culled historical data, attributed the "transition from the simple nuisance to maritime quarantine laws of the early part of the century, to the systematic scientific search for conditions prejudicial to health and to the influence of the English press and novelists. The leisure class which demanded paved streets, sewers, hydrants and pest houses began to rebel against disease and squalor in the crowded portions of great cities. Dickens revealed abuses in schools and tenements; Reade exposed prison outrages, epidemics of cholera uncovered the slums where the Poor Commission of 1832 found sights disgraceful to a Christian land." Life tables were invented in 1834; previous to this time practically all statistical tables were contained in church records. With the establishment of the life table the alarming death rate and waste of life and capital became apparent and Parliament legislated to correct the sanitary evils found by the Commission to study the state of health in large towns. Then, as now, legislation intended to protect the public throughout England met with opposition. Many protested that it was governmental interference for Parliament to legislate for the control of "bad drainage, overflowing cesspools, festering grave yards, impure water, filthiness and humidity of low lodging houses." These conditions were thought to be the effective means of eliminating the less fit. Interesting debates in Parliament brought out various arguments in favor of and against providing machinery for enforcing sanitary procedures. On the one hand it was argued by Herbert Spencer that such legislation would amount to a "social tax for the good of society and directly for the comfort, enjoyment, security and peace of the rich, whose health was menaced and whose wealth was rendered less serviceable and less enjoyable because of the known presence of filth, disease, poverty and crime." Huxley, in rebutting Spencer's inconsistent argument, is said to have replied: "If my next door neighbor chooses to have his drains in such a state as to create a poisonous atmosphere, which I breathe at the risk of typhoid and diphtheria, he restricts my just freedom to live just as much as if he went about with a pistol threatening my life."

This early sanitary legislation by parliament is said to have been opposed only by those who had "some special interest, such as smokestacks, factories or insanitary dwellings for rent, or, perhaps, a pet theory to defend." Laborers were especially active in promoting the measure, petitions coming in from unions of all sorts, pamphlets and books of model towns were circulated throughout the country and the answer to Spencer was given to the satisfaction of those members of society who were generally able to buy comfort and health, and, of course, for the good of all classes, more particularly the poorly housed.

Whilst it required two years to pass this legislation in England and as a sanitary measure we would regard it of a very poor type today, the gain to England and to the world, was great, as it led to the establishment of the principle that the "state is responsible for sanitary conditions throughout its entire area and is under obligations to see to it that health laws are everywhere properly executed in the interests of the State at large." This long continued agitation in favor of better sanitary procedures in England quickly reached this side of the Atlantic and resulted in similar legislation throughout the United States.

It is true that as early as 1700 the first quarantine law on the North American Continent was established for the Port of Philadelphia and was entitled "An Act to prevent sickly vessels coming into this government" and that prior to this time a quarantine order, not a definite law or regulation was established by the local courts in Massachusetts, but all of the early sanitary laws of the Commonwealth that amounted to anything were for the one city of the Commonwealth, namely, Philadelphia.

The first State-wide law relating especially to the several municipalities giving them full authority to control nuisances and to establish local health regulations under the direction of Boards of Health, was the general city Act of 1874. Few municipalities, however, did any effective sanitary work. The Act creating the State Board of Health and Vital Statistics in 1885 gave semblance of centralized authority to sanitary procedures and permitted the State Board of Health to clothe the municipalities with additional powers, but failed to provide the Board with funds to enforce regulations which they might adopt, and it was not until 1893 when boroughs were granted the power to organize Boards of Health, and in 1895 when cities of the second class were granted similar power that much stimulation was given to public health work. The Act of '95 gave the first State-wide legislation for the control of communicable diseases but was not generally enforced for the same reason, viz: that the State Board of Health had insufficient funds to carry out the provisions of the Act. With the formation of the State Department of Health in 1905, and the granting to the Commissioner of Health sufficient authority and financial assistance, the greatest State-wide public health campaign was started that the Commonwealth has seen.

With the twentieth century, a general educational campaign was started throughout the civilized world that tended to popularize all health measures and all health teaching. State and national organizations profited by this campaign, municipal health bodies were stimulated by it and the lay public were prepared to have sanitary measures enforced in a way that had not been possible heretofore. With the additional powers given the centralized State government, in the protection of water supplies, in the collection of vital statistics, and in the enforcement of rural sanitary measures and rural quarantine, and the appointment of the full time health officer, local organizations saw on every hand evidence of uniform enforcement of procedures that were both safe and sane in their application and designed with proper consideration to public health and to commercial interests. Quarantine measures were worked out and defined with due regard to maximum protection of the public and minimum disturbance of legitimate pursuits, everything being done to secure the greatest amount of protection with the minimum amount of disturbance to the public. Publicity given to all health measures, both State and municipal, prepared citizens for the enforcement of any measure tending to protect community health and has made it possible for sanitarians to perfect procedures not heretofore thought possible of enforcement.

Most municipalities in this Commonwealth have complied with the laws, permitting the chief executive officer or the President of Council to appoint a local Board of Health. The Act of May 23, 1899, provided that cities of the third class, of which Wilkes-Barre is one, shall through the Mayor appoint five members, who shall serve without compensation and none of whom shall be members of Council, and each of whom shall serve for a period of five years, the method of appointment being that the Mayor shall nominate and the Select Council shall approve the appointment.

The powers and duties of the Board are to enforce all needful rules and regulations to prevent the introduction and spread of infectious or contagious diseases, by the regulation of intercourse with infected places, by the arrest, separation and treatment of infected persons, and persons who shall have been exposed to any infectious or contagious disease, and by abating and removing all nuisances which they shall deem prejudicial to the public health; to enforce vaccination, to mark infected houses or places, to prescribe rules for the construction and maintenance of house drains, waste and soil pipes and cesspools, and to make all such other regulations as they shall deem necessary for the preservation of the public health.

They shall also have power, with the consent of Councils, in case of the prevalence or apprehended prevalence of any contagious or infectious disease within the city, to establish one or more hospitals, and to make provisions and regulations for the management of the same. The Board may in such cases appoint as many ward or district physicians and other sanitary agents as they may deem necessary, whose salaries shall be fixed by the Board before their appointment. It shall be the duty of all physicians practicing within the city to report to the Secretary of the said Board of Health the names and residences of all persons coming under their professional care afflicted with such contagious or infectious diseases in the manner directed by the said Board.

The Board or its employees may enter upon any property for the purposes of investigating nuisances, enforcing contagious disease regulations and for the purpose of inspections. They shall make and publish reports and shall submit annual estimates to Councils and make annual reports thereto. Further, they shall make reports weekly and annually to the State Commissioner of Health and shall forward to him all of their reports. Evidently the thought in mind of the legislators who framed and passed this bill was that members of City Councils are elected without regard to any particular qualification for public health work, and they are a legislative body and not an executive body. It is only a matter of chance whether or not among the various members of a City Council there may be a physician; therefore, the material from which a sanitary committee of Councils can be chosen is necessarily very much restricted.

On the other hand, by taking advantage of the provisions of the Act of 1889, the Mayor may choose five members to constitute a Board of Health from among the medical men and the laity of the entire city and can provide a Board especially qualified for public Health work and at the same time relieve the Councils, who have many important official duties to perform from this responsibilty.

The Act of 1889, provides a uniform law for the whole State for the management of health affairs in cities of the third class, and has the advantage of having been frequently reviewed and interpreted by the courts.

It gives to the Board of Health powers which are not conferred by law on sanitary committees of Councils and provides a means to prevent the introduction and spread of contagious diseases and to secure the abatement of nuisances.

The Act of May 14, 1909, regulating plumbing and house drainage in cities of the third class, is legislation which is of great importance to all cities. This Act presumes that every city has a Department, Bureau or Board of Health, and does not in any way refer to a sanitary committee. It is probably inoperative in cities in which there are no Boards of Health.

The Act of May 14, 1909, regulating the control of contagious diseases, is an organic law applying to all municipalities of the State. This law also presumes every city to have an established Board of Health. Its enforcement is imposed upon such a body and the fact that any city was without such a Board would probably prevent the enforcement of the Act by the local authorities.

The time has long since passed when the sanitary work of a municipality can be delegated haphazard to untrained men and expect the community to get skillful service from them. The Board of Health has for its chief function the defining of the policies to be followed by the executive officer of the Board, the formulation and endorsement of local legislation believed to be essential for the proper working out of public health matters and at times the Board may be called upon to act in a quasi-judicial capacity. The Secretary or executive officer, or Board representative in every large municipality, should be a trained man, with considerable knowledge of medicine, with considerable knowledge of sanitary engineering, including all of its side lines; street cleaning, sewage and garbage disposal, sanitary plumbing, abatement of nuisances, and should have rather a complete knowledge of epidemiology, especially as applied to the communicable diseases prevailing in the State. Such an officer should be a full time salaried man and if he is worth anything at all as a sanitarian, will earn many times the salary the municipality pays him, no matter how high that salary may be. The time has long since passed when the sanitary authorities may rest content by simple enforcement of quarantine measures for the control of communicable diseases and the enforcement of the laws for the abatement of nuisances. Indeed, in these days such administrative details constitute the smallest and easiest part of the executive officer's duties.

It is absolutely essential that citizens of the municipality be educated to a proper appreciation of what sanitary measures mean. We can only go by force a little way in advance of public opinion. The modern sanitarian never takes an advanced step until he has the public prepared to accept it. He must be one of the educational factors in the community as well as an executive officer and must be surrounded by a corps of sufficient size to enable him to carry out his general campaign. He must be able to secure the co-operation and assistance of all organized effort interested in improving the health and morals of the community as well as those interested in and administering her charities and education.

The policy pursued by the modern health board in regard to contagious diseases is that "every communicable disease is dependent for its spread upon the transfer of tangible material from a specifically infected person to the next victim. He further knows that this infectious material is given off from the affected individual in the body secretions and excretions, except in that group of diseases in which some insect acts as an intermediate host."

"The value of any policy directed against the control of communicable disease must necessarily be measured by its success in limiting this transfer of infectious material from individual to individual."

In public health work we judge the effectiveness of the campaign in municipalities directly in proportion to the success demonstrated in limiting infectious virus to narrow quarters.

Another feature of health work in relation to communicable diseases that is now receiving the attention of modern sanitarians, and is destined to figure largely in future work, is that of building up the resistance of individuals, thereby lessening their chance of contracting contagious disease even though exposed to its virus.

An organic law of the Commonwealth, framed evidently with the thought in mind that a certain uniformity must exist in public health regulations, provides that certain communicable diseases shall be reportable, that others shall be quarantinable, and further, it fixes certain minimum quarantine periods for the entire Commonwealth. The same Act gives to the municipal Health Board the right to exceed this minimum requirement by such extensions of quarantine periods and such further restrictions of infected individuals or their families as the local Board may see fit to impose, but the same Act specifically provides that municipal authorities (a fact which Boards of Health or Councils sometimes overlook), may not abridge the organic Act of the Commonwealth or the regulations of the State Department of Health. Some municipalities may not feel that it is incumbent upon them to establish regulations for the control of chickenpox or other so-called minor disease. The law just referred to specifically defines certain measures to be followed, with these diseases, and the community that does not enforce this provision of the Act in relation to the long list of diseases enumerated is not lawabiding.

One of the first regulations adopted by the present State Department of Health, and an act that has probably done more than anything else in popularizing quarantine and lessening communicable disease is that of establishing regulations defining quarantine and providing procedures to be followed with different diseases.

Within the memory of many medical men now in practice, municipalities were familiar with absolute quarantine only, that is quarantine with guards and those guards usually armed, a relic of the earliest procedures established at the ports of entry in the early history of this country. The method followed was too much quarantine or no quarantine at all. With the advancement of the science of bacteriology in the latter part of the eighties and the early nineties a sufficient knowledge of the cause of communicable disease was acquired to permit health authorities to begin rational enforcement of regulations tending to limit the spread of communicable diseases. We learned the cause of typhoid fever, and how diphtheria and any number of diseases were transmitted, and as we learned something of their cause and transmission, learned necessarily how we might protect ourselves against these infections and that these diseases were for the most part preventable.

The first quarantine procedures introduced for these diseases, however, were in some communities too radical and in others too slight to do any good. The State Department of Health, in formulating quarantine regulations for a number of diseases, specifically provided for a modified definition of quarantine, qualifying the old Standard regulation by naming it absolute quarantine and establishing the new type of regulation, denominating it modified quarantine. Nothing was added to the old type of regulation, but our new type of regulation was worked out with due regard for maximum protection of individuals with minimum loss of earning capacity and a new phase of quarantine procedure began.

As all of you medical men know, modified quarantine may be established for anthrax, chickenpox, diphtheria, erysipelas, German measles, glanders, malarial fever, measles, mumps, relapsing fever, scarlet fever and typhoid fever, and of these modified types of quarantine further regulations provide for absolute isolation on the part of the person so afflicted; for instance, in scarlet fever or diphtheria, if the person afflicted is isolated from all members of the household, and if the nurse or caretaker at no time comes in contact with persons living in other parts of the dwelling, the wage earner, by changing his clothes, may continue his occupation except with certain extra hazardous lines of work, such as handling food stuffs, working on cloth, etc., the plan being to permit the wage earner to earn a living for himself and family and at the same time teach him a proper appreciation of how individuals may be protected from infectious virus. It is probably true that the chain of household quarantine is sometimes broken and that the infectious virus may occasionally be carried out of the dwelling. This we expect now and then and will continue to meet for a long while. Each such lesson, however, should be used by the sanitary authorities to impress upon the community the importance of attention to detail.

In certain communicable diseases provision is made both by Act and regulation for limiting the movements of the infected individual alone, notably in whooping cough, erysipelas and typhoid fever, where members of a household may continue school attendance even where these diseases are under treatment in a dwelling, provided there is some degree of separation of the sick from the well and that some sort of isolation is continuously kept up and concurrent disinfection of discharges is faithfully carried out.

Municipal sanitary authorities should keep constantly before them charts of all the communicable diseases under quarantine regulation, showing infected dwellings arranged by streets and blocks. Every new case of communicable disease should be carefully investigated and faithful efforts should be made to determine the source of the infection. Every infected dwelling should be studied by a competent inspector and the health officer should be satisfied that all precautions are being taken to limit the virus, not alone to the infected home but to the single room of the dwelling. Any discharges liable to convey the virus should be thoroughly destroyed by means of heat or by use of antiseptics. The visiting sanitary officer should be so trained that he may give specific instructions to the householder or nurse in these details, and further, he should provide the householder with printed circulars, setting forth clearly and plainly what is common knowledge among medical men concerning methods of isolation and details of disinfection.

The need for this sort of teaching is perfectly evident. First because many physicians are so busy that they can give but little time to teaching the housewives the information they ought to possess concerning a quarantinable disease, and second, even where such instruction is given by the physician, the housewife, worried, as she often is on account of illness, may forget what she has been taught, hence a repetition on the part of the sanitary authorities can do no harm; and further, the handing of the printed circular to the mother covering the same points on which she had been instructed verbally, gives her an opportunity to read the instructions when she is calm and alone with the sick, and it is very much more likely, under such circumstances, to make the impression desired by the sanitary worker. If the municipal authorities are able to do so, they should provide these circulars to the householder printed in the language with which the family is most familiar.

Within recent years the question of public nuisances and their abatement has taken an entirely new aspect. A distinguished member of the medical profession, during the year 1885, impressed a lesson upon the civilized world as to the importance of taking care of human waste that has resulted in the saving of thousands and thousands of lives. I refer to the classical report on the Plymouth epidemic of typhoid fever, written by Dr. Lewis H. Taylor, of Wilkes-Barre.

Following Dr. Taylor's description and the publication of similar reports on smaller epidemics, health authorities concentrated their efforts to keeping human waste out of public drinking water supply and to-day this is one of the great problems of a centralized public health department.

The awful epidemic of typhoid fever incident to the camp life of our American soldiers during the Spanish-American war proved the common house fly to be responsible for the conveyance of the virus of epidemic disease in filth carried on its feet and body, so that since that time a better reason is at hand for proper disposal of night soil and stable manure. The argument that the full or overflowing privy, foul piggery or ill-kept stable is a nuisance because of the unsightly appearance and horrible stench, is still further strengthened by the damning knowledge that it is a positive menace to health because of the facilities given for breeding and feeding flies.

From the Department's experience in handling typhoid epidemics in large municipalities we have no hesitancy in saying that typhoid fever and probably certain other communicable diseases may be very greatly lessened by routine sanitary inspection, through cleansing and disinfection, and the screening of privies in communities still using buildings of this type; by proper removal of stable manure and by the preventing of surface pollutions.

In 1905 the Department handled an outbreak of typhoid fever in the city of Nanticoke, where for the first time in epidemic work every nuisance, such as a full or overflowing privy, every ground pollution of any sort, whether by human excreta direct or indirect pollution from wash water and kitchen waste was abated and routine disinfection of vaults and ground surfaces was carried out by using freshly burned lime, and we were very much gratified to note that the secondary cases occurring were greatly lessened; and the dragging out of the epidemic long after the water was purified and the primary cases removed to the hospital was prevented thus proving the value of this sort of work. The same sort of experience in a dozen or more epidemics since has led to the conviction that routine work of this sort on the part of municipal health authorities will very greatly lessen the prevalence of typhoid fever and that it will probably do the same thing with diptheria, scarlet fever, tonsillitis and every filth born disease.

It is not possible in a brief communication to discuss fully the various phases of work that municipal sanitary authorities should be doing. But we can profitably discuss some definite plan of organization, outlining what would seem to be a good scheme of work in a municipality having a population say of a hundred thousand people.

As already pointed out a Board of Health should consist of five members, two of whom are to be medical men. This Board of Health is to be appointed by the Mayor of the city, in a city of the third class, and the appointment is to be approved by Select Council. The Board of Health should adopt rules and regulations, determine policies to be followed and elect a Secretary, who shall not be a member of the Board, and such additional officers as may be required to perform the city's public health work. The Secretary and his office staff would naturally perform the executive work for the Board. The Secretary should be a full time officer in any city of considerable size and should be the directing head. The Board of Health would discuss with him at their weekly or monthly meetings the various policies to be pursued and would endorse such recommendations as meet with their approval upon needed local legislation prior to its going to the sanitary committee of Councils for shaping into legal ordinances and adoption as local law.

The work directed by the Secretary and staff of the Board might well be divided into six or seven divisions, the first of which might be referred to as Contagious Diseases. This division of the work would naturally embrace the receipt of morbidity reports from practicing physicians and householders, the enforcement of quarantine regulations in the municipal limits, the disinfection of houses at the conclusion of legal quarantine periods, the issuance of certificates to public school authorities, Sunday school authorities and libraries, the issuing of wage earners' permits. and if the city is fortunate enough to have that needful institution, an isolation hospital, they might well direct its control and management.

A second division in a good many municipalities might deal with providing and maintaining efficient water works and sewerage systems, detailed plans of which would be approved by the State Department of Health before installation. In a great many communities this division would come in a Department of Public Works.

A third division of municipal work might be known as that of Child Hygiene. Under this division an important branch of the work would deal with the welfare of infants. the home teaching of mothers prior to birth, the education of mothers in the proper care of children at the time they are born, and in the preparation of food stuffs for them, bathing, dressing, and their care during the earliest months of life. In most municipalities the medical inspection of schools might be worked out in this division. Even if the medical inspection of schools would not be done in this division the Secretary should have such close co-operation with the inspector for the School Board that all communicable disease shall be followed up at home, that the under-fed and illy nourished school child shall be given better food and that the mentally or physically defective, the aenemic and the tuberculous may be especially provided for.

Another important division of municipal sanitation is that of Food Inspection. Even though a municipality may not undertake a supervision of slaughter houses and dairy farms outside of the city limits, this work probably being more of a State function, there are certain inspections within the municipality that should be done by health authorities. The handling of meats, the sanitary condition of the meat shop itself, the display of meat in the markets so as to protect it from flies, dust and other filth, naturally come under a division of this sort. So, too, may the handling of milk within municipal limits, whether in the retailer's wagon or the grocer's shop, come under sanitary supervision of food supplies. Milk shops and retailers wagons should be standardized as to cleanliness and milk as to quality and purity. Even the fruits that are displayed for sale need certain supervision by health authorities. What is more common than that the retail grocer or the sidewalk peddler shall display fruits to be eaten raw, within range of swarms of flies or clouds of dust that render it unwholesome. The same argument would seem to make it necessary for the health authorities in different divisions of its work to supervise bakeries and bake shops, and the handling of bread, cakes, crackers, etc., in a way that will protect these important foodstuffs from hurtful influences.

A fifth important division of municipal sanitary work would naturally deal with nuisances, the question of garbage disposal, the cleanliness of alleys, the prevention of surface pollution, the proper control of surface drainage, the cleanliness and sanitary condition of privies and backyards, and the sanitary condition of vacant lots so as to protect them from pollution and stagnant water, and lastly, and perhaps most important of all, the work this division could undertake, that of abating mosquito and fly breeding places.

A sixth division of work might deal with Plumbing Inspection. Many municipalities do this work fairly well, but it is very important that this work be done either in the Health Department or in connection with the Building Inspection Department, in order that the installation of plumbing shall be made in a sanitary manner, that all drains shall be properly trapped, that all closets shall be properly vented, and that sewer connections shall be made in such a manner that the danger from the flooding into cellars and basements of dwellings be prevented, and that tenements may be sufficiently supplied with water at convenient places on each floor.

Lastly, every municipality might well establish a Laboratory Service in which cultures from the throats of patients suffering from inflammatory conditions might be studied, in which blood tests might be made where the physician suspects typhoid fever or other infectious disease, where milk might be examined that is believed to be dangerous to health, and where a large amount of routine work might be done in connection with the various activities of the local health authorities.

All of these phases of public health work might be referred to as the executive side of the work to be directed by the Secretary and his office staff, and it is safe to say that this part of the executive work in any municipality is the easiest and smallest volume of work to be done.

The Secretary of the Board of Health must be a real educational force in the community. Whilst he may have on the one hand these all important divisions of work well organized and the details well carried out, his duty as a public officer is not yet half finished. It is absolutely essential in these days of efficient organizations and public effort that the health authorities work hand in glove with the various organizations equipped to do executive work along definite educational lines. It is essential that co-operative assistance be secured from the medical profession, the school authorities, the clergy, the public press, the sociological workers, including women's clubs, civic clubs, Boards of Trade, philanthropic agencies, charitable organizations, church organizations, child welfare clubs, little mothers' clubs, and a thousand and one kindred societies. The efficient public health officer, with one hand upon the executive side of the work, with the other hand constantly cultivates the assistance and invites the co-operation of these valuable organizations in such a way that health teaching is carried into the home of every citizen. These organizations can do as much, in some instances more, in protecting life and health than can the health officer and his staff. The teaching of the health officer may reach the ears of a goodly number of citizens, but with the assistance and co-operation of the numerous members of each of these associated organizations, the teaching can be increased many hundred fold and may be carried into the homes in the community in a way that will count in life and health.

Probably no stronger argument could be produced in favor of a Board of Health than that of securing the constant co-operation of the various allied organizations that can do so much in public health work; and an executive officer who not only can secure their assistance, but who is so fully alive to the needs of the municipality which he represents that he may apportion much of the work to these various societies and outline or suggest new lines of effort for these valuable agencies to take up.

The little scheme of organization herewith submitted gives a fairly graphic demonstration of the ties that should exist between the local executive officer and the various administrative branches of work on the one hand, and co-operative association with the various agencies inspired with the strongest desire to be helpful in making the community better, happier and healthier, and always ready to work at his elbow.

HEALTH BULLETIN SCHEDULE.

No.	Issue.	Subject.
1.	July, 1909,	Disease-Breeding Power of House-flies and Methods of Prevention.
2.	Aug., 1909,	Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, etc.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be Avoided in the Daily Fight Against Tuberculosis.
8.	Feb., 1910,	Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Penna. The Results of Four Years' Work of the Department.
10.	April, 1910,	Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910.	Experiments on Tubercle Bacilli. Old Tuberculin and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculōsis Schools.
19.	Jan., 1911,	Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly, How it Develops, why it must be Destroyed and How to Destroy it.
24.	June, 1911,	Effects of Tubercle Products on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Penna. State Dept. of Health.
27.	Sept., 1911,	Tuberculosis in the Country as well as in the City, A Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911.	The Preparation of the Biologic Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from, etc.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects.
33.	Mar., 1912,	The Opportunity for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912.	Battling for Life at Mont Alto.
40.	Nov., 1912.	Tuberculin.
41.	Dec., 1912.	Dr. Dixon's Address at Duquesne, Pa. Conservation of Health
42.	Jan., 1913.	Municipal Sanitation.
43.	Feb., 1913.	
44.	Mar., 1913.	
45.	April, 1913.	
46.	May, 1913.	
47.	June, 1913.	
48.	July, 1913.	
49.	Aug., 1913.	
50.	Sept., 1913.	
51.	Oct., 1913.	
52.	Nov., 1913.	
53.	Dec., 1913.	
54.	Jan., 1914.	
55.	Feb., 1914.	
56.	Mar., 1914.	
57.	April, 1914.	
58.	May, 1914.	
59.	June, 1914.	
60.	July, 1914.	
61.	Aug., 1914.	
62.	Sept., 1914.	
63.	Oct., 1914.	
64.	Nov., 1914.	
65.	Dec., 1914.	
66.	Jan., 1915.	
67.	Feb., 1915.	
68.	Mar., 1915.	
69.	April, 1915.	
70.	May, 1915.	
71.	June, 1915.	
72.	July, 1915.	
73.	Aug., 1915.	
74.	Sept., 1915.	
75.	Oct., 1915.	
76.	Nov., 1915.	
77.	Dec., 1915.	

P416h

PENNSYLVANIA
Health Bulletin

No. 43. HARRISBURG, PA. February, 1913.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

TUBERCULOSIS AND OUR SCHOOLS

HARRISBURG, PA.:
Wm. Stanley Ray, State Printer
1913

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No 43. HARRISBURG, PA. FEBRUARY, 1913.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

TUBERCULOSIS AND OUR SCHOOLS

The School Code adopted in 1911 makes specific provisions for the exclusion from school of any person having tuberculosis of the lungs, whether such individual be a pupil, teacher, janitor or other employee, unless such school be a special school carried on under regulations made for such schools by the Commissioner of Health.

Section 1609 of the Code makes further provision that the teaching of physiology and hygiene shall also include special reference to tuberculosis and its prevention, and that these subjects shall be introduced and studied as a regular branch by all pupils in all Departments of the public schools of this Commonwealth, and in all educational institutions supported wholly or in part by money from this Commonwealth. It was plainly the intent of the Legislature that every teacher in this Commonwealth should have particular knowledge of both the causes of tuberculosis and its prevention and that this knowledge should be utilized in teaching children both the cause of tuberculosis and the practical methods of its prevention.

Pulmonary tuberculosis, consumption, the great white plague, phthisis, are but different names for the same disease. It is older than Christianity, and is perhaps responsible for more deaths than any other half dozen diseases in the whole category of human afflictions. This disease was known by various names to all the ancient peoples and reference to its ravages may be found on cuneiform tablets in the remains of Babylon; it was known to the Egyptians, and old Biblical references, 1500 B. C., are now understood to refer to tuberculosis. This disease is common in many animals and references to its ravages in cattle may be found in the Talmud. Hippocrates gave a classical description of it. Isocrates and Aristotle taught that it was contagious, Aretaeus believed in the efficacy of sea air as a curative agent and of sea voyages for those who were afflicted. Pliny favored placing those who were phthisical in the pine forests and Galen favored treating those who were ill with consumption in the high lands of Phrygia.

Wendell Phillips, in his famous lecture "The lost arts," has enumerated many things known to ancient people. He might well have mentioned the fact that many things taught by the ancients about consumption were forgotten, as indeed they must have been, for the teaching of its contagiousness and the various kinds of climatic treatment already enumerated, although familiar to some of our physicians and utilized by them, were often urged as new discoveries subsequent to the wonderful work in bacteriology in the early eighties. Indeed after the discovery of the cause of tuberculosis in 1882, every method of climatic treatment practiced by learned men two thousand years and more ago, was repeated over and over again, and much of their practice was found to have in it valuable truth.

Tuberculosis is a disease chiefly affecting the lungs of human beings, although it may include any part of the body; glands, bones, joints, skin. For the purpose of this paper the type that affects the lungs will be chiefly considered. The cause of tuberculosis is now well known; it, like many other communicable diseases, is caused by a small vegetable organism known as the tuberculosis bacillus, this particular germ being so small that six or seven thousand of them placed end to end would not exceed a linear inch, and about one hundred thousand of them might be placed side by side in the space of one inch.

This tuberculosis germ frequently enters the human economy by way of the upper air passages directly, or indirectly, through the other port of entry the digestive tract, finding lodgment somewhere in the very small bronchial tubes or air cells; and in individuals whose resistence is low, in those who have been working too hard and eating too little, or who are depressed from grief, or whose resistance is lowered because of colds, of excesses of any sort or from serious disease, it finds a favorable soil. At first the growth produces small nodules, first pin-head in size, occasionally increasing to the size of a marble or larger, the germs clustering together until thousands or even hundreds of thousands may have grouped in one little mass known as the tubercle.

If the resistence of the individual is sufficient to cope with the invading germs they are surrounded by inflammatory tissue and are healed in and a little nodule remains into which lime salts from the tissues are deposited, and the whole is referred to as a healed tubercle, the disease getting its name tuberculosis because of the curious and interesting grouping of the germs as they multiply and grow in the human body and the little masses formed thereby.

Where the resistance of the individual is not strong enough to prevent the multiplication and growth of these germs they invade other areas of the body and lead to the formation of other tubercles, to ulceration of the surrounding tissues. Often the tuberculous area becomes infected with other micro-organisms which with the tubercle bacilli cause a rapid breaking down of a considerable area of tissue and to the formation of an abscess or cavity.

The same sort of multiplication of germs and tubercles similar to those described are noted wherever growth occurs and from these initial growths the germs may be widely disseminated by the circulating body fluids, lodgment being found in the lymphatic glands of the body or the tissues. Probably many of the glandular types of tuberculosis occur in this way. Glands in the neck are often infected secondarily to involvement of the tonsils; those of the abdomen secondarily to infection of the glands in the walls of the intestines.

The infection gaining entrance by way of the alimentary canal is usually caused by infected food, infected hands, infected drinking cups, etc. Milk may occasionally be responsible for some of this type of infection. Probably the most common source of infection in early infant life, however, is the infection children pick up while creeping along dirty floors, handling dirty toys and picking up germs distributed throughout their homes and elsewhere by tuberculous individuals who are careless in their habits and deposit their sputum on the floor of their homes and public places.

Almost every individual has at some time in life picked up some of the germs of tuberculosis. Most of us fortunately have been able to resist them. Unfortunately, thousands of individuals whose lungs have been infected have not sufficient resistance to prevent multiplication of germs and colony after colony develops, tubercle after tubercle is formed, abscess after abscess follows, one cavity forms, two cavities and so on, until the lung tissue is broken down to such an extent that there is not enough left to support life. An abscess may slough into a blood vessel, producing a hemorrhage. Other individuals not having such termination may have the germs from the abscess cavity carried into many areas of the lungs, pneumonia may develop and death may ensue from this widely disseminated infection. Some may tend to throw off the broken down areas of lung adjacent to these tubercles and abscesses, may rid themselves of the greater portion of the infection, may have the abscess cavity heal by scar formation, and may live on with damaged lungs, living possibly for months or years, discharging numbers of tubercle bacilli with each mass of material coughed up from the lungs. Yet it may be prevented in almost every instance.

From what has already been said two thoughts must naturally present themselves: first, the lowered resistence of the individual, therefore the necessity of keeping up the general health; second, as the disease is caused by a germ it must be destroyed. To this end the sputum must be placed in a box or cup until burned. Careless people will, however, infect rooms, buildings, etc., which must be disinfected. Teachers must make their pupils understand the importance of keeping the resistance of the individual up to the maximum point, the importance of fresh air, sunshine and good food and proper clothing. They must teach how the excessive use of alcohol and tobacco, intemperance of all sorts and very exhausting labor, with improper food lower resistance and render us liable to contract disease.

It is the duty of teachers to impress upon all pupils with whom they come in contact. that individuals having coughs throw off with each act of coughing fine particles of moisture. Many germs may be released in this way only to be a menace to others or to infect others. Everyone having a serious cough, even though it may not be consumption should be made to prevent the scattering of droplets of moisture about inhabited rooms. By holding a paper handkerchief in front of the mouth each particle of material that is coughed up and expectorated may be collected and placed in a receptacle to be destroyed by fire or boiling or by use of germicides. Further, that those known to have tuberculosis must sleep alone and live apart from others, especially children, as much as possible.

Modern hygiene demands of every individual having consumption a higher degree of cleanliness than would seem to be demanded of the healthy. Such individuals, if men should always be clean shaven so that the germs may not collect about the hairy portions of the face. They should have separate eating utensils, and these utensils should be boiled after using; they should wash their hands before shaking hands with others, and always before eating. They should sleep in separate rooms, and their bed clothing, particularly the outer covers, which are apt to catch some moisture each time the patient coughs when asleep, should frequently be washed and should always be boiled before washing so that the germs may be killed. The personal clothing of such individuals must frequently be changed and should be disinfected in like manner. The rooms occupied by those having the disease should be disinfected.

In time not long gone by the individual having consumption was practically given his doom when the announcement was made. That time fortunately has passed. It is a long way from the time of Hippocrates to the beginning of the 20th century and yet during most of this long interval, to be the child of a consumptive was partically to be doomed to die of consumption. All this has changed, and in the nearly two thousand years that intervened most of this gloom might have been lifted from the human race had only the teaching of Hippocrates, Galen, Aretaeus and Celsus been followed early and religiously. These men were wise in their day. They realized the value of fresh, pure air, in the treatment of those having lung diseases and whilst they did not have the knowledge that the disease is caused by a specific germ known as the tubercle bacillus, and whilst they did not realize as fully as we do that by proper rest and by avoiding fatigue the individual's resistance may be brought up to a point where he can recover, they did have that empirical knowledge which led them to note great improvement from life in the open.

Teachers may encourage their pupils having tuberculosis by informing them that they need not die from it. Teachers should inform their pupils that in this great Commonwealth, in every county and in some counties in a number of the large centres of population, a Department of Health dispensary is available, where the services of a physician and nurse may be secured, and that these State officers will tell them how to live and what to eat and how to sleep; that at these dispensaries the advice of the doctor and the nurse is free of cost; that at the dispensary they will be given spit cups and paper kerchiefs and other paraphernalia to protect those with whom they come in contact; and where advisable the tuberculous sick may be admitted to the various state sanatoria for prolonged treatment and care. You are safe in saying to them that instead of looking forward to death as a relief from this disease, they may look forward hopefully to cure and that their friends, and the members of the household who may have anticipated the same fatal end may look forward with equal promise to escape from this disease.

Since 1907 the Commonwealth of Pennsylvania has been actively engaged in a campaign looking toward the stamping out of pulmonary tuberculosis, or if not indeed looking toward the ideal of completely stamping it out, they have looked toward reducing it to the minimum. Beginning in 1907, the Legislature of the Commonwealth gave the sum of $1,000,000 to the State Department of Health to be used during the appropriation period of two years in a campaign for the education of those suffering with consumption and for the care of those who are already afflicted. $600,000 of this money was to be spent upon the building and maintaining of sanatoria, $400,000 for the establishment of free dispensaries and for the publication and dissemination of literature. A subsequent Legislature doubled this amount of money. The Legislature of 1911 appropriated a total of $2,624,000 for this cause. The Legislature of 1913 just ending gave $2,659,660, and to-day Pennsylvania is doing more toward the eradication of the great white plague than any other state in the Union, and possibly more than any other country of equal size on the face of the globe.

The youth of Pennsylvania should be taught to be proud of what her Legislature has done in making it possible, through most liberal appropriations to the State Department of Health, to offer to the indigent of Pennsylvania greater advantages in the tuberculosis campaign than have been offered elsewhere.

Today the Department of Health of this Commonwealth maintains 114 dispensaries, with 222 physicians and 110 nurses ready to render service to all who may seek it; and in addition has the largest tuberculosis sanatorium in the world at Mont Alto, in the southern part of the state in Franklin county, with 1,058 beds, all free to the indigent. There those who may have tuberculosis in an incurable stage are given hospital care; those who are not so ill and who have some chance of getting well may be given care in cottages; all under the skillful supervision of doctors and nurses; and even children who are sick with the disease may be housed in the commodious building taking care of 100 children under 14 years of age.

Within six months a second sanatorium has been completed and placed in operation at Cresson, where 340 patients are being cared for, and within another twelve months a third institution will be completed at Hamburgh, Berks county, where 480 patients will be treated.

It is well that teachers should know what this great Commonwealth is doing in the campaign for tuberculosis; it is well that they should know that the law making bodies of this Commonwealth have made it possible for the State Department of Health to offer to Pennsylvania these splendid advantages. It is well that you should be reminded of the requirements of the School Code, that teachers must give all of their pupils instruction in the methods of dissemination of tuberculosis and in methods of prevention.

Prior to 1907 work along these lines was entirely educational and missionary. Previous to 1906 the health authorities in this Commonwealth had insufficient funds and could do little work. No statistics of any value were gathered. Children were born, lived long lives, died, and were buried with less likelihood of an official record being made in any governmental way than would have been the case with a horse or cow. Beginning with 1906, an official record was made of all births, deaths, and marriages. The real bookkeeping of humanity was begun then in this state in 1906, and since that time all births, deaths, and marriages have been properly recorded and filed away in fire proof vaults in Harrisburg, and we now fully realize from these accumulated figures how devastating have been the ravages from some of the various communicable diseases; we now fully realize how serious has been the damage done by pulmonary tuberculosis.

Large sums of money have been spent since 1907, much has been invested in buildings which were essential for the work to be carried on. Already some results may be seen. The Department realized when starting on this campaign that it would take five, ten, or fifteen years to make any considerable showing in the saving of human life. The registration of deaths, however, is the only true criterion by which preventive measures may be calculated and it is by this showing the Department is willing to be judged. In 1906 the total number of deaths from all forms of tuberculosis was 10,780, this being the first year that statistics were properly credited. In 1907, 10,825 deaths occurred, since that time the disease has gradually declined, a total of 9,855 being recorded for 1912. A total of 925 deaths a year does not seem like very much, but remember that during that time the population was rapidly increasing so that from the total of 7,141,000 in 1906, we have increased to 7,969,904. We were entitled to have more deaths and we had fewer.

When the rate of deaths per 100,000 population in 1906 is considered and contrasted with 1912, the figures are still more pleasing. In 1906 the death rate from tuberculosis per 100,000 was 150.9; in 1912 the rate per 100,000 was 123.7, a saving of more that seventeen (17.2) for each 100,000 population. Had the death rate for 1906 for tuberculosis continued up to the end of 1912, instead of having 9,885 deaths from tuberculosis in 1912 we would have been entitled to have 11,026 or a total of 1,141 more lives than were actually lost from the ravages of this disease.

If the value of a human life be calculated at the rate usually placed upon it by a judge and jury, about $5,000 per individual life, you will readily see that the total saving of lives during the one year of 1912 from tuberculosis alone would equal the entire amount of money appropriated by the State since 1907.

Other factors may have existed in lessening the death rate from tuberculosis. Every application of modern hygiene is bound to show its results in the saving of human life, not only from tuberculosis, but from other forms of communicable disease. It is true there has been a saving in human life from tuberculosis of about 1,000 a year for the last five years, or more than twenty million dollars of saving in human life and yet it would not be fair to say that all of this saving has been due to the tuberculous campaign alone. It is true that had the general death rate for all diseases for 1906 continued the same until the end of 1912, more than 58,000 human beings would have died who are now alive and presumably well; and it is perhaps true that the total expenditure of funds in public health work by the state by municipalities and by philanthropic and charitable agencies, and that the total amount of public education by teachers, principals and superintendents, and others has been largely instrumental in reducing this mortality. Nevertheless it is a fact that all Pennsylvanians must be proud of, that thousands and thousands of human lives have been spared and that hundreds of thousands of cases of illness have been avoided through the instrumentality of public education and public health work. To educational work great credit must be given.

With the few short years of active public health education showing so much, what may we expect when every teacher in the land drills into every pupil coming under his or her care the essential principles of preventive medicine, when the young of America are educated to a proper appreciation of the ravages of tuberculosis and other forms of communicable disease, and to a proper knowledge of their prevention, when the death rate may be largely a death rate of the weak in early infancy and of the aged; when the real public health millenium arrives.

HEALTH BULLETIN SCHEDULE.

No.	Issue.	Subject.
1.	July, 1909,	Disease-Breeding Power of House-flies and Methods of Prevention.
2.	Aug., 1909,	Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, Bacillus Coli, and Bacillus Anthracis.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be Avoided in the Daily Fight Against Tuberculosis.
8.	Feb., 1910,	Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Pennsylvania. The results of Four Years' Work of the Department.
10.	April, 1910,	Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria: How it is Caused and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly. How it Develops, why it must be Destroyed and How to Destroy it.
24.	June, 1911,	Effects of Tubercle Products on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Pennsylvania State Dept. of Health.
27.	Sept., 1911,	Tuberculosis in the Country as well as in the City, a Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biologic Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from Pulmonary Tuberculosis.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects.
33.	Mar., 1912,	The Opportunity for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Conservation of Health. Dr. Dixon's Address at Duquesne, Pa.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	Tuberculosis and Our Schools.
44.	Mar., 1913.	
45.	April, 1913.	
46.	May, 1913.	
47.	June, 1913.	
48.	July, 1913.	
49.	Aug., 1913.	
50.	Sept., 1913.	
51.	Oct., 1913.	
52.	Nov., 1913.	
53.	Dec., 1913.	
54.	Jan., 1914.	
55.	Feb., 1914.	
56.	Mar., 1914.	
57.	April, 1914.	
58.	May, 1914.	
59.	June, 1914.	
60.	July, 1914.	
61.	Aug., 1914.	
62.	Sept., 1914.	
63.	Oct., 1914.	
64.	Nov., 1914.	
65.	Dec., 1914.	
66.	Jan., 1915.	
67.	Feb., 1915.	
68.	Mar., 1915.	
69.	April, 1915.	
70.	May, 1915.	
71.	June, 1915.	
72.	July, 1915.	
73.	Aug., 1915.	
74.	Sept., 1915.	
75.	Oct., 1915.	
76.	Nov., 1915.	
77.	Dec., 1915.	

614.0973
P416k

PENNSYLVANIA

Health Bulletin

No. 44. HARRISBURG, PA. MARCH, 1913.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE RELATION OF THE UNDERTAKER TO THE PUBLIC HEALTH.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D.

No 44. HARRISBURG, PA. March, 1913

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

THE RELATION OF THE UNDERTAKER TO THE PUBLIC HEALTH.

The importance and value of a comprehensive and accurate system of registration of vital statistics under Governmental control is recognized in all civilized countries. Briefly, the history of laws in Pennsylvania relating to the registration of births and deaths is as follows: An Act of Assembly was passed in 1851 providing for a system of registration which was inaccurate and was never put in general practice in the State.

Registration of births and deaths and the requiring of certificates from physicians and issuing of burial permits before interment, was first practiced in the cities of Philadelphia and Pittsburgh under local ordinances. The Act of May 5, 1876, provided for registration of births and deaths in cities of the third class. No provision was made in this Act for burial permits, and no responsibility was placed upon undertakers. The Act of June 7, 1881, provided for burial permits in cities of the third class having local Boards of Health. The provisions of this Act were enlarged by the more comprehensive Act of Assembly of May 28, 1889, creating Boards of Health in cities of the third class and defining their powers and duties. This Act created a complete system of registration in these municipalities and provided for returns of births and deaths by physicians and mid-wives, and the issuing of burial permits thereon, and penalties for violations thereof. By Act of May 11, 1893, the provisions of the Act of 1889 were extended to the boroughs of the State. The first move towards securing records of births and deaths throughout the rural districts of the State was by Act of Assembly of June 6, 1893, which provided for the registration of births and deaths in the several counties of the State, the records thereof to be kept by the Clerk of the Orphans' Court upon returns of assessors of the various townships, boroughs and wards.

By Act of Assembly of June 3, 1885, there was created a State Board of Health and Vital Statistics, which Board was given general supervision of the registration of Vital Statistics throughout the State, but owing to the insufficiency of appropriations the State Board of Health was able to accomplish little in the way of establishing a State system.

By Act of Assembly of April 27, 1905, the Department of Health of Pennsylvania, was created and the Commissioner of Health was charged with the general supervision of State registration of births, marriages and deaths, and by Act of May 1st, of the same year a central Bureau of Vital Statistics, under the immediate direction of the State Registrar was established as a division of the Department of Health, since which time an accurate system for the registration of births and deaths has been established and maintained in Pennsylvania.

Under the provisions of these Acts the State was divided into eleven hundred and seventy registration districts, consisting of cities, boroughs and townships, and a local Registrar appointed for each district, each local Registrar immediately upon his appointment selecting and appointing a deputy who should act in his stead in case of absence, illness or disability.

In districts of large area for the convenience of the people the local Registrar was also authorized to appoint sub-registrars for different portions of his district in order that certificates could be filed, and burial permits secured without undue delay. The provisions of this Act apply to births and deaths, but since professionally the interests of the undertaker in births is indirect we will confine this discussion to the law as relating to deaths and burials, calling atention however to the provisions that stillbirths are treated as deaths, and burial or removal permits are required in the usual form; and while mid-wives are authorized to sign birth certificates, they can not sign certificates of death for stillborn children; and where still births occur with a mid-wife only in attendance, they shall be treated as deaths without medical attendance.

It is the duty of the Undertaker to obtain and file with the Registrar a certificate of death, obtaining the personal and statistical information required on the certificate from a member of the family, or person best qualified to give this information, and this part of the certificate shall be signed by the informant. If any physician has been in attendance upon the deceased, he shall then present the certificate to such physician for the medical certificate, the cause of death or other part necessary to complete the record, which information must be made on the certificate over the signature of such physician. He shall then state the facts required relative to the date and place of burial over his signature and his address.

In case of death without medical attention, including stillbirths, it shall be the duty of the Undertaker to notify the Registrar of such death and to present the certificate to the local Health Officer or the Coroner as directed by the Registrar for the medical certificate of the cause of death and other parts necessary to complete the record.

Under certain circumstances it is necessary that the Undertaker should secure from the Registrar a transit permit. When a body is conveyed to the place of interment by private conveyance, no transit permit is needed, but when it becomes necessary to use a common carrier as a means of transportation, then the transit permit must be secured. If the place of burial is within the State of Pennsylvania, the burial permit issued by the local Registrar at the place of death will be valid.

The transit permit must be tacked on the casket or box in which the body is enclosed. When interment is made in another State, the laws of that State must be observed in the interment.

When a body is brought by common carrier from another State into this State, the burial permit issued in the other State, must be surrendered to the local Registrar and a new permit is issued by him in accordance with the facts set forth in the original permit.

While the laws of the State impose upon the Undertaker the responsibility of securing the death certificate, it, at the same time, divides this responsibility by making it a misdemeanor for the physician or for the Registrar, Deputy Registrar, or Sub-Registrar, to in any way neglect or refuse to perform the duties imposed upon him; or for a sexton or caretaker of a cemetery to receive a body for burial without the burial permit having been first delivered to him.

Under the law no burial permit can be issued and no interment take place without a proper certificate of death having been first filed with the Registrar, deputy or sub-registrar of the district.

As the blanks for death certificates are required to be furnished by the local registrars, the law requires that the Undertaker shall, without delay, register his or her name, address and occupation with him. This provision is of great importance both to the Registrar and to the Undertaker.

As it frequently becomes necessary for the Undertaker to make affidavit to facts in connection with death and burial, a special Act of Assembly was passed in 1907 authorizing Registrars and Sub-Registrars to administer oaths, and further providing that no fee should be charged by them.

The laws concerning the making out of death certificates and the issuing of burial permits apply to deaths from all causes. In cases of death resulting from a contagious or infectious disease, the Act of May 14, 1909, requires that in the preparation for burial it shall be the duty of the Undertaker to thoroughly disinfect such body and place it within the casket in which it is to be buried within six hours after being first called upon to take charge of the same, provided said call is made between the hours of 5 A. M. and 11 P. M. otherwise such body shall be placed in the casket within twelve hours and that the casket shall thereupon be closed tightly and not opened again unless permission be granted by the health authorities for special and satisfactory causes, and that such body shall not be allowed to remain unburied for a longer period of time than 36 hours after death, unless by special permission of the health authorities.

The services held in connection with the funeral of such bodies must be private. The attendance shall include only the immediate adult relatives of the deceased, who may not at the time be under absolute quarantine restrictions, and the necessary number of adult pall-bearers.

Any advertisement of the funeral must state the cause of death and the body shall in no instance be taken into any church, chapel, public hall or public building. Such bodies must in all instances, be conveyed to the place of burial in a hearse or vehicle used for the purpose of conveying corpses only and only the necessary number of conveyances may be furnished which will be required to carry the adult relatives who are permitted to attend, and the pall-bearers, and all such conveyances must be fumigated and disinfected in the manner required by the health authorities.

These are, briefly stated, the duties and requirements set forth by law to be observed by undertakers, the enforcement of which is imposed upon the Department of Health, but the relation of the Undertaker to public health work and the collection of vital statistics is far more important than can be expressed in organic law.

It would appear at first thought that the successful administration of health laws depended largely upon the co-operation and assistance of the medical profession. So indeed it does, but the earnest support of the Undertaker is just as vital and far-reaching in its effects. While this work is yet in its infancy, our experience has already shown us it is of inestimable value.

It is of value to the State Government to get accurate statistics of births and deaths and the prevalence of disease, potent factors when estimating the growth and prosperity of the Commonwealth, guides to the enactment of necessary remedial laws, but valuable as they are to the State they are of yet a greater value to the private citizen. With access to authentic records of births and deaths, property rights are protected and relationships, otherwise so vague that without such records they could not be considered by the Court, can be established. Under the law, certified copies of these records can be secured upon the payment of a nominal fee, which certificates must be received in evidence in the several courts of the Commonwealth. Even though our system has been in operation for only six years, more than three thousand requests of this kind are received in the Bureau of Vital Statistics each year.

The reporting of contagious and infectious diseases protects the citizen by the establishing of quarantine regulations so that he may not unwittingly be exposed to contagion. It checks epidemics which, if left unbridled, would spread through entire communities. It advises him of dangers unseen in the water or milk which he uses, and provides a means for purifying the water and food supplies.

In all this work Undertakers have an active and important part. In observing the laws, he directly secures complete returns of deaths. As many children die in infancy and their death certificates when reaching the files may or may not show a corresponding report of births, it makes failure on the part of physicians or mid-wives to report births dangerous and frequently supplies indisputable evidence of such failure. In the same manner the Undertaker aids materially in securing complete returns of contagious diseases. Frequently prosecutions for failure to report diseases are based upon a death certificate signed by the physician who has not professionally reported the same in compliance with the law. Here again the death certificate is the best evidence of failure to report obtainable and with a few such lessons here and there, prompt reporting of disease is better secured.

The laws of the State protect the Undertaker in the practice of his profession by providing for a State Board of Undertakers and the issuing of licenses to those who have shown themselves to be competent, and making it a misdemeanor for anyone to practice the profession without due registration and licensure. This the state practically does without compensation, as the small fee paid for licenses is only used for defraying the proper expenses of the Board of Undertakers.

The relationship of the Undertaker to the local Registrar is in harmony with these laws. In order that anyone may secure blanks for death certificates, or that burial permits may be issued to him, it is necessary that he register with the local Registrar, declaring his name, profession and place of business. If an imposter should undertake this without having been duly registered and licensed, he would be furnishing conclusive evidence against himself for violation of the law.

While it may appear to some that the health laws impose duties upon the Undertaker for which no compensation is provided, it is really a not unreasonable return for the protection the laws afford, and it is a valuable public service. All municipalities in all governments whether national, state or township, impose important and in some instances arduous duties upon citizens without compensation. Among them may be such posts as membership in council, boards of school directors, and township supervisors and responsible men can always be found who are willing to devote their time and energies to such duties even though they receive no pay. Here and there a practicing physician complains that the State has imposed upon him, by requiring him to make reports of births and deaths and contagious diseases, but these complaints are individual only. All the organized Medical Societies of the State warmly uphold the work of the Department of Health and the laws which govern it. Perhaps occasionally an Undertaker may have the same feeling that has been expressed by individual physicians, we do not know, but we do believe that we have the active and heartfelt support of all of their organizations as sincerely as we have the support of the Medical Societies.

The Bureau of Vital Statistics has met with success in its work. From being classed by the Federal Government as a non-registration State prior to 1905, in this brief time, Pennsylvania has taken an enviable place among the registration states of the Union. We fully realize that this success could not have been possible without the co-operation of the Undertakers of the State and we are glad for an opportunity to say to them that whatever glory there may be in such an achievement belongs as well to them as to the officials who represent the State Government.

As early as the year 1906 the Census Bureau of the Federal government in its report on page 468, said the following: "The Bureau of the Census rests its case entirely upon the results achieved by the Pennsylvania law. From having, as Dr. Chapin states, the "poorest registration of any of the Eastern or Middle States," in 1905, the year that the law was enacted, and fifty-four years after the passage of the first Pennsylvania law for this purpose, it had in 1906 the first year of the operation of the new law, an effective registration of births and deaths practically as complete as that of any registration state in the country and far superior to those of the majority of registration states. The keynote of the Pennsylvania administration is compulsory obedience to the reasonable requirements of the law, and infliction of the penalty of the law in cases of its violation."

In the performance of its duty the Department of Health has sometimes found it necessary to institute prosecutions for violations of the law, if this were not done, the law would be useless and ineffective and we are glad to say that even in this matter we feel that we have had the co-operation of the organized Undertakers.

In several instances Undertakers have repeatedly violated the law and after repeated prosecutions had been instituted against them, they were taken up as old offenders by the State Board of Undertakers and their licenses were revoked and their places of business closed. Thus not only the laws relating to the Department of Health and the Bureau of Vital Statistics have been brought in play, but the laws of the State referring to licensing of Undertakers have been invoked and we believe the results of such proceedings have been even more marked than have been the results obtained by the enforcement of our laws which can only impose fines or imprisonment.

HEALTH BULLETIN SCHEDULE

No.	Issue.	Subject.
1.	July, 1909,	Disease-Breeding Power of House-flies and Methods of Prevention.
2.	Aug., 1909,	Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, etc.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be Avoided in the Daily Fight Against Tuberculosis.
8.	Feb., 1910,	Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Penna. The Results of Four Years' Work of the Department.
10.	April, 1910,	Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly, How it Develops, why it must be Destroyed and How to Destroy it.
24.	June, 1911,	Effects of Tubercle Products on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Penna. State Dept. of Health.
27.	Sept., 1911,	Tuberculosis in the Country as well as in the City. A Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biologic Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from, etc.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects.
33.	Mar., 1912,	The Opportunity for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Dr. Dixon's Address at Duquesne, Pa. Conservation of Health.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	The Tuberculosis Nurse under State Direction.
44.	Mar., 1913.	
45.	April, 1913.	
46.	May, 1913.	
47.	June, 1913.	
48.	July, 1913.	
49.	Aug., 1913.	
50.	Sept., 1913.	
51.	Oct., 1913.	
52.	Nov., 1913.	
53.	Dec., 1913.	
54.	Jan., 1914.	
55.	Feb., 1914.	
56.	Mar., 1914.	
57.	April, 1914.	
58.	May, 1914.	
59.	June, 1914.	
60.	July, 1914.	
61.	Aug., 1914.	
62.	Sept., 1914.	
63.	Oct., 1914.	
64.	Nov., 1914.	
65.	Dec., 1914.	
66.	Jan., 1915.	
67.	Feb., 1915.	
68.	Mar., 1915.	
69.	April, 1915.	
70.	May, 1915.	
71.	June, 1915.	
72.	July, 1915.	
73.	Aug., 1915.	
74.	Sept., 1915.	
75.	Oct., 1915.	
76.	Nov., 1915.	
77.	Dec., 1915.	

◆

P41Ch

PENNSYLVANIA

Health Bulletin

No. 46. HARRISBURG, PA. MAY, 1913.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

TROY TYPHOID FEVER EPIDEMIC

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

PENNSYLVANIA

Health Bulletin

No. 46. HARRISBURG, PA. MAY, 1913.

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

Entered as Second-class Matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

TROY TYPHOID FEVER EPIDEMIC.

On October 12, 1912, in order to investigate the reported prevalence of typhoid fever in Troy, Bradford County, Pennsylvania, the State Department of Health sent men from the Medical and Engineering Divisions into the field to investigate the cause and remedy the same.

The borough of Troy is an old one and the citizens are, for the most part, retired agriculturists, dairymen or employes of three principal industries, the Troy Engine and Machine Company, the Troy Tanning Company and the Troy Creamery Company. From a financial point the Borough is considered the most thriving muncipality in Bradford County. There are many wealthy residents. The population has varied but little during a period of 30 years; in 1890 the United States Census Reports recorded a population of 1,307; in 1900, 1,450; and in 1910, 1,288. The census made by inspectors of the State Department of Health during October, 1912, recorded a population of 1,343.

The township of Troy surrounds the Borough and the major portion of the watershed of the West Branch of Sugar Creek, from which the municipal water supply is obtained, and the local ice supply is harvested. During a period of 10 years there have been but 2 cases of typhoid fever reported from premises located on the West Branch of Sugar Creek and its tributaries. The first case was reported on March 1, 1912, and will be referred to later in a consideration of the source of the epidemic. In addition, 4 cases were reported during February and 1 each during the months of May and June, 1912, but these cases were definitely shown to bear no relation to the epidemic. The Borough has been previously free from typhoid fever; 1 case was reported during 1911 and 9 during the months of 1912 prior to the epidemic.

Up to and including October 12, 24 of the cases which initiated the epidemic had been reported to the local Board of Health. A conference with the members of the Board of Health and the physicians practicing in the Borough was held immediately after arrival and a list of those who were suspected to have the disease was obtained for making a census.

The census was taken as follows:

Patient, ...Township, ... County, ...
Householder, ...Address, ...
Owner, ...Address, ...
Age, ... Male Black Married Widowed / Female White Single Occupation, ...
Name and address of employer or school, ...
Where taken sick, ...Date of first feeling sick, ...
Doctor's name and address, ...Date of first visit, ...
Nurse's name, ...How long attending, ...
Total population of household, ...No. of other cases in household, ...
Visitors to premises within 30 days? Yes. No. Name, ...
Address, ... Where have visits been made within 30 days? .... Visits to other cases? Yes. No. Food or drink taken? Yes. No. Sick room screened? Yes. No. Water used at home.................. at work,.......................... Other water used within 30 days, ...
Milk supplied by ....In cans,........Bottles,........How long from can?.............
Other sources within 30 days, ...
Use of milk. Beverage, Yes. No. / Dressing, Yes. No. / Coffee or tea, Yes. No.
To whom is milk furnished? ....
Ice cream within 30 days days? Yes. No. Where purchased?..................................
Shell fish within 30 days? Yes. No. Where purchased?..................................
Uncooked vegetables or fruits within 30 days? Yes. No. Where grown?..........................
Name of dealer supplying ice, ...Where harvested?......................
Drinking cups, table ware, etc., boiled? Yes. No. Sewer connection? Yes. No. Privy? Yes. No.
How are stools and urine disinfected? ....
Disposal of stools and urine. Sewer. Privy. Cesspool. Buried.
Are stools and urine at any time exposed to insects, flies, etc.? Yes. No.
Garbage disposal, ... Kitchen waste, ... Wash water, ...
Have they unslaked or chlorinated lime? Yes. No. What other disinfectants?......................
How and where used?..
Animals—Cats, Dogs, Birds, Chickens, Rats, Mice, Other?..................................
Circular left, ... House placarded, ...
Abatement notices, ... What for? ....
Remarks:

The census is made by trained inspectors, who report daily to the officers in charge and who dictate the details of each case to an inspection clerk. From the latter's records the tabulated results are compiled.

EPIDEMIOLOGY.

This report includes all cases occurring between the onset of the first case, September 26, and of the last case, December 25, a period of 90 days. There were 232 cases reported, or 17.27 per cent. of the population, 201 of which were located permanently in Troy Borough.

Troy Borough census showed that the population of 1,343 resided in 367 buildings. The location of cases occurring in the Borough showed no unusual distribution except that only 2 cases lived on that portion of the distributing system which carries the water supply from the Pennsylvania Railroad Spring, located in the southwestern portion of the Borough. These cases lived above the pressure area of the main supply, and were probably infected while using water at other points in the Borough. Except for this localized area, the distribution in relation to streets or sections showed no inequality or peculiarity. Everything pointed to the general water supply.

122 or 33.24 per cent. of the 367 premises in the Borough housed persons ill with the disease, the distribution being as follows:

72 houses with 1 case.
32 houses with 2 cases.
9 houses with 3 cases.
3 houses with 4 cases.
2 houses with 5 cases.
1 house with 6 cases.

OCCUPATION.

33 occupations are represented in the 232 cases reported, that affecting 10 or more persons being as follows:

Servant,	10 cases.
Housewife,	37 cases.
School,	80 cases.

30 cases having no occupation were under six years (school age) or were over 80 years of age. These may be properly classified with those whose daily relationships were for the most part domestic and would make a total of 157 persons or 67.3 per cent. of the morbidity whose daily activities did not remove them from their immediate home relationships. It represents also that class of individuals who would be less likely to suffer exposure, in points remote from home, to infections by members of the typho-colon group.

The age and sex were as follows:

AGE AND SEX.

	Male.	Female.	Total.
0-4,	3	7	10
5-9,	14	24	38
10-14,	12	13	25
15-19,	18	15	33
20-24,	10	8	18
25-29,	10	17	27
30-34,	9	7	16
35-39,	7	9	16
40-44,	9	8	17
45-49,	2	6	8
50-54,	6	4	10
55-59,	3	2	5
60-64,	2	1	3
65-69,	1	4	5
80-85,	0	1	1
	106	126	232

The age of many cases was under the usual period of greatest susceptibility, that is, the predominant age was between 5 and 20 years. 73 or 31.42 per cent. were under 15 years, 65 or 28 per cent. were over 35 years, 94 or 40.52 per cent. were between 15 and 35 years of age, the period of greatest susceptibility especially when the infection is water-borne.

A study of occupation and age, together with the wide range of total susceptibility, suggested some other factor not usually found in water-borne epidemics. As will be shown later water was the transmissive agent to all except secondary cases. In previous water-borne epidemics in Pensylvania, an average of from 60 to 80 per cent. of cases has been between 15 and 30 years of age while in milk or ice-cream epidemics the predominant age has been well below 15 years, and no unusual prevalence among those of domestic employment or habits has been noted.

The degree of pollution of the water supply would not account for the high morbidity. In the Coatesville epidemic, during February 1912, large amounts of raw sewage were suddenly turned directly into the distributing mains of the Borough water supply and the degree of pollution must have been excessive. The usual water supply was taken by open streams flowing through thickly populated watersheds and was distributed without sedimentation or treatment; it has been proven that the citizens had for years been using polluted water. However, only 2 per cent. of the individuals exposed developed the disease. In the Troy epidemic the infection occurred after excessive precipitation in one of the many sources of supply and about 2 miles from the points of distribution, hence, the infection must have been well diluted before the water was used and the morbidity was 17.27 per cent.

Another factor is that water-borne diseases, such as bacillary dysentery, para-typhoid and typhoid fever, have not been epidemic in this community and the residents have not developed that "accustomance" to repeated minimal doses of the toxins of micro-organisms found in the fecal discharges of human beings or animals and, it is probable, that an unusual *community susceptibility* to infection by bacteria of this group existed in Troy.

This theory has some confirmation in the total morbidity which amounted to 17.27 per cent. of those actually exposed to infection. In no other reported epidemics has there occurred so high a relative morbidity. In the Plymouth epidemic, Luzerne County, during 1895, there was a morbidity of about 11 per cent. in Butler, Butler County, 1903-4, the morbidity was about 7 per cent. of the total population.

The total population of 161 households in which the 232 cases occurred was as follows:

Borough,	582 persons,	201 cases.
Township,	118 persons,	31 cases.
Total,	700 persons,	232 cases.

10 of the 232 cases were unquestionably secondary cases, that is, 478 persons were exposed to contact infection with 222 cases. Hence, the morbidity in this class was 2. 09 per cent.

It is noted, of course, that the 478 had been exposed to the primary source and had escaped infection. But the contact morbidity, never-the-less, is low and is probably attributable to careful domestic hygiene.

A study of the sources of infection in the 10 secondary cases is shown in the following table:

Mothers acting as nurse:

Borough Case No. 195, Onset Nov. 9, infected by own child.
Borough Case No. 198, Onset Dec. 1, infected by own child and husband.
Borough Case No. 199, Onset Dec. 9, infected by own children.
Borough Case No. 200, Onset Dec. 23, (N. J.), infected by own child.
Township Case No. 31, Onset Dec. 27, infected by own daughter (108 Borough).

Professional Nurse:

Borough Case No. 193, Onset Dec. 2, infected by own patient.
Borough Case No. 196, Onset Dec. 1, infected by own patient.

Food Infection:

Borough Case No. 197, Onset Dec. 17, food prepared by housekeeper who nursed another case.
Township Case No. 23, Onset Dec. 3, infected by food at home of father.

Carrier:

Borough Case No. 201, Onset Dec. 25, infected by convalescent visitor.

METHODS OF TRANSMISSION.

Flies. Flies were almost immediately excluded as being factors in transmission. They were said to be common during the summer months but the temperature was sufficiently low at the time of the epidemic to prevent incubation of this insect and in no place were they found in any abundance. The homes in Troy are very well screened but no protection is made for protection of food stuffs in the markets.

Shell Fish. 25 or 10.77 per cent. used shell fish purchased at 6 different stores or restaurants; 3 of the stores obtained the supply from the same dealer. The small number using shell fish made it unnecessary to follow out further epidemiologic or bacteriologic examinations.

Milk. The 232 cases obtained milk supplies from 75 different sources, of which 41 or 17.66 per cent. obtained the supply from cows on the same premises. 2 denied the use of any other than condensed milk.

There were three principal dealers distributing milk in the Borough, 1 of which supplied the families of 86 or 37.06 per cent. of those developing the disease, 1 supplied 21 or 9.05 per cent. and another, 26 or 11.2 per cent.

S. supplied milk to 157 families, in which there occurred 86 cases of typhoid fever. His wife gave the history of typhoid fever occurring 20 years previously. During the past year, she assisted in the dairy work, principally in washing bottles and other utensils. In order that it might be shown that she was or was not a carrier case, repeated examinations of the feces and urine were made in the State Department Laboratory, but at no time was any pathogenic member of the typho-colon group recovered.

H. supplied 39 families, in which 21 cases of typhoid fever occurred. J. supplied 45 families, in which 26 cases of typhoid fever occurred. But in neither was it possible to discover the evidences of previous typhoid in proprietor or employes.

There was practically no trading between dealers. Bottles were used by S. only and there is every reason to believe that refilling on the wagons was not practiced.

Ice Cream. At some time within the incubation period, 108 of the 232 cases had used ice cream. In 15 instances it was "Home-made" from milk and cream obtained from cows on the same premises. In 93 cases it was obtained from 10 local dealers, 3 of whom supplied 80 of the 93 cases. These 3 dealers purchased their entire supply from a manufacturer in Elmira, N. Y. An investigation of the latter's plant proved negative.

Ice. The supply in use in the Borough came from one dealer who harvested his entire stock from the West Branch of Sugar Creek, at a point about one and a half miles below the municipal collecting system. The stock in use during the summer prior to the epidemic was harvested during January and February of 1912. Specimens of water were collected from the ice pond during the early part of December 1912 and gave following counts

	Bacteria per c. c.	B. coli per c. c.
North end,	2,500	320
South end,	2,000	400

The bacteriological examination of the ice as collected from the distributing wagons gave negative results for *B. Coli* and the highest total count recorded was 17 per 1 c. c. In view of the fact that there were no cases of typhoid fever occurring in the borough prior to the end of September, at which time ice was being less used than during the warmer months of the year, that it is a well known fact that ice stored for a long period of time tends to destroy or render inactive micro-organisms of the fecal type and that but a relatively small percentage were using ice at the time of the epidemic, ice as a means of transmission was readily excluded.

Water. An analysis of the use of water gave the following results:

Troy Borough, water supply only,	157	or 67.67%
Troy Borough, water supply and well,	26	or 11.20%
Troy Borough, water supply and spring,	20	or 8.62%
Troy Borough, water supply, spring and well,	2	or 0.86%
Troy Borough, water supply and various,	20	or 8.[illegible]%
Spring only,	2	or 0.[illegible]%
Spring and well,	2	or 0.[illegible]%
Well alone,	2	or 0.[illegible]%
Well and various,	1	or 0.[illegible]%
	232	

However, as is shown, 225 or 96.98 per cent. used Borough supply either alone or with water from some other source. Of the various supplies other than the local municipal supply, water had been obtained by patients in Canton, Galeton, Hughesville, Grover and Mansfield, Pa., Elmira, and Wellsburg in New York State, and in Illinois and New Jersey. It was possible to secure information from health authorities in the various districts noted and typhoid fever was not

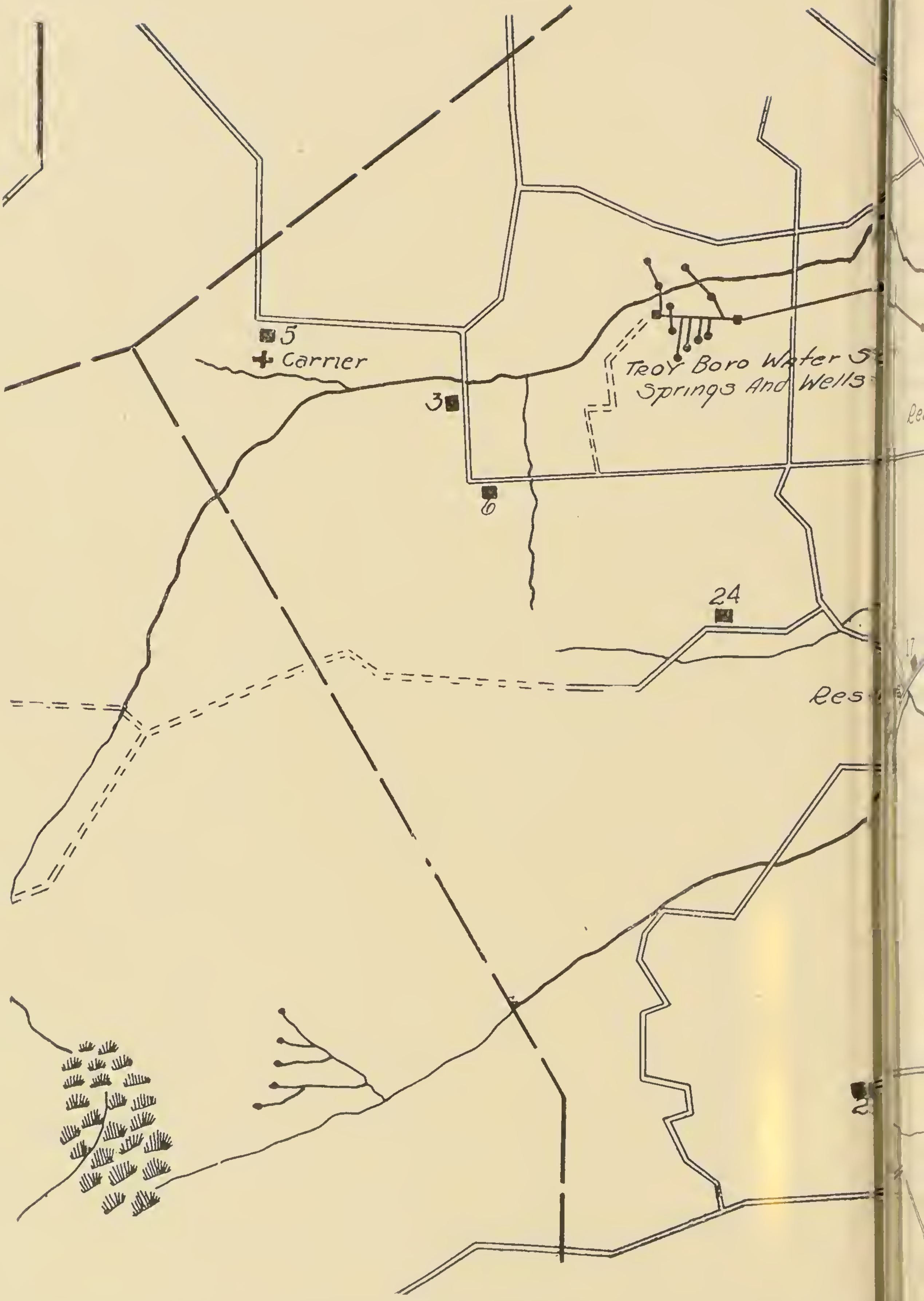
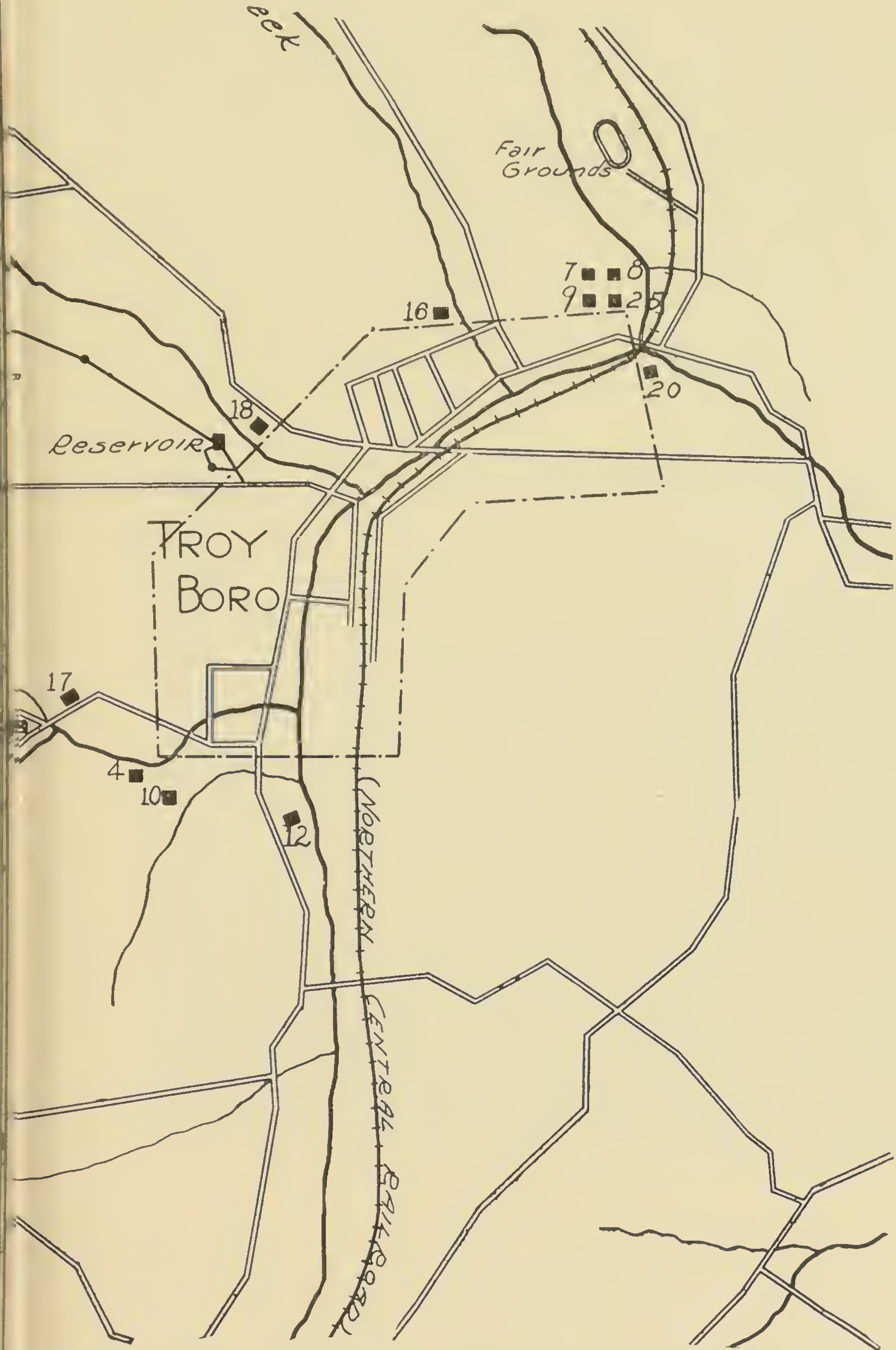


Fig. 1.—Troy Borough and Troy Borough Water System in Troy Township, showin
is noted by a cross (+) on the banks of Spring Run. Case 5 in the same premises oc



on of the collecting system to the creek (drawn to scale). Location of the carrier g the third week of the epidemic.

at that time reported prevalent. The studies of physical environment and bacteriological anaylses of wells and springs in use in the Borough or vicinity readily excluded them as transmissive agents.

The Troy Borough Water Company is owned and operated by the municipality itself. The main supply was originally designed from a system of springs located about one and one-half miles west of the Borough limits, at a point known as the "Spring Lot." The Spring Lot consisted of three acres of land on which were located six shallow springs and two flowing drilled wells 8 inches in diameter and 100 and 194 feet deep respectively and, in addition, there was an underground concrete wall intended to divert the ground waters from a small collecting chamber located in a meadow on the opposite side of the creek to a collecting reservoir. The water was collected in a system of open joint tile pipes and conveyed to a common collecting reservoir known as Upper Reservoir, from which it passed by gravity to the Lower Collecting Reservoir and then through an 8-inch main to a distributing reservoir at the edge of the western borough line.

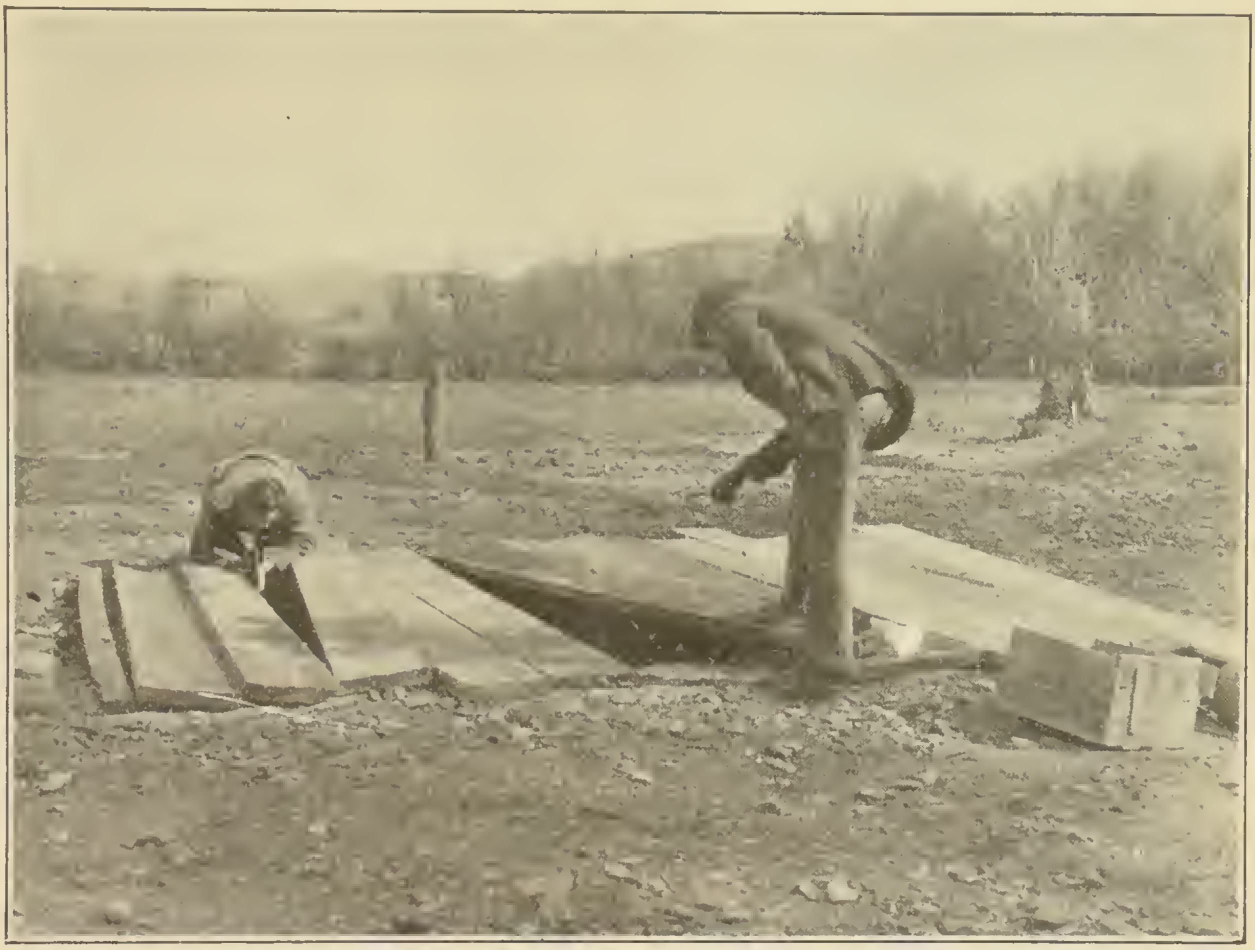


Fig. 2.—The upper collection reservoir, 35 feet distant from creek bank. Piping of drilled well noted in background.

In addition to this main supply, an auxiliary supply (1) was obtained from a drilled well located close to the distributing reservoirs. This well was 4 inches in diameter and 265 feet deep. It was used only as an auxiliary supply, pumped by air, and had a capacity of about 50,000 gallons daily pumpage; (2) a small low surface district in the southwestern end of the Borough was furnished with a supply from a spring owned by the Pennsylvania Railroad Company about a mile southeast of the Borough. The piping from this well was connected to the principal supply after furnishing about 30 families in that section of the Borough.

The normal flow from the Spring Lot with the creek water shut out amounted approximately to 80,000 gallons in 24 hours. This was markedly increased by changes in the creek water, indicating the surface nature of the supply.

The two distributing reservoirs had a total storage capacity of 200,000 gallons. All of the water except that from the Pennsylvania Rrailroad spring passes through these reservoirs.

The West Branch of Sugar Creek flows across the Spring Lot. It was not the intention, according to the evidence collected, that the waters of this creek should enter the water supply collecting system. However, a perforated barrel, covered with a flag stone, had been sunk into the bed of the creek at a point 35 feet east of the Upper Collecting Reservoir.

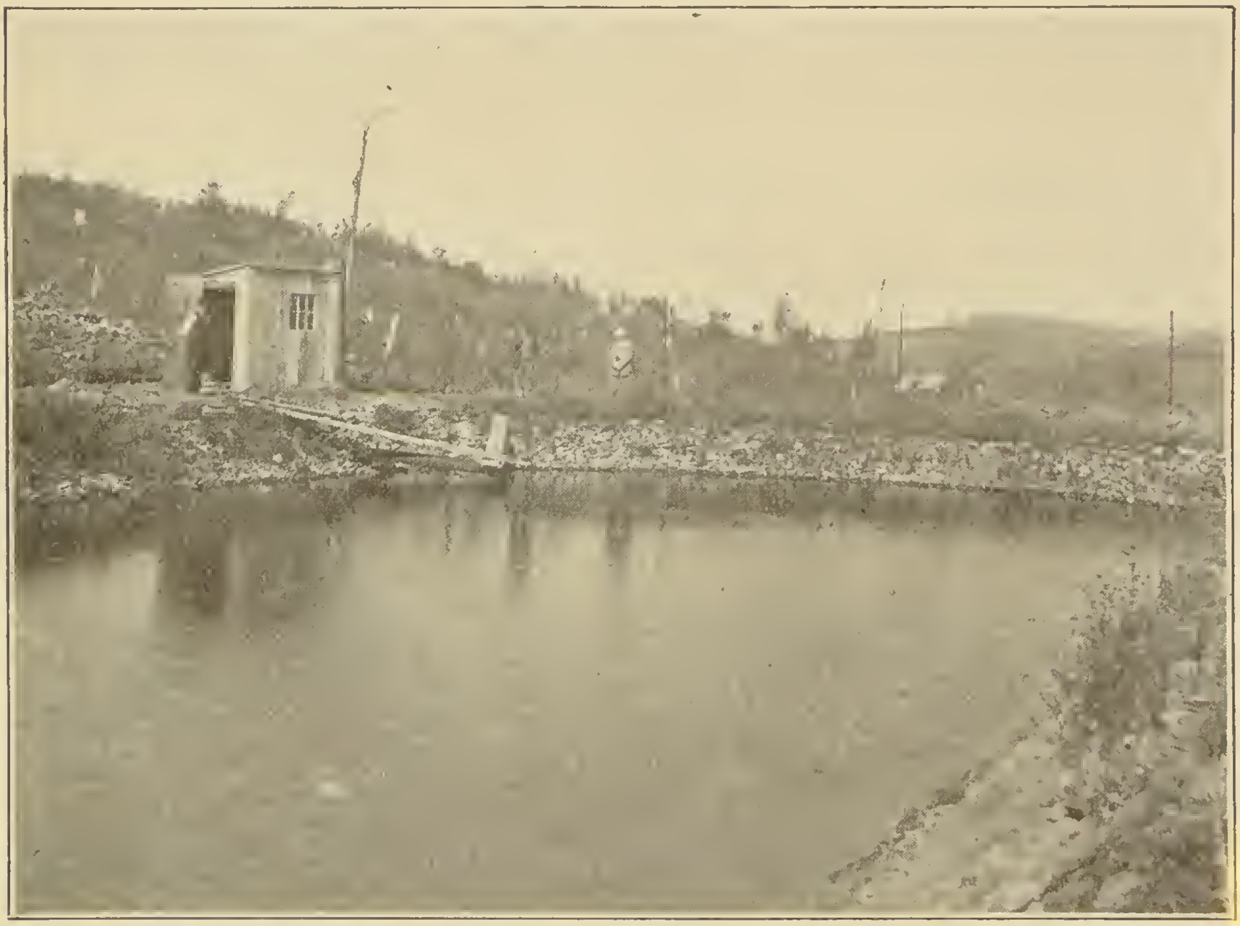


Fig. 3.—The open distributing reservoir, the discharge pipe from the collecting system, and the temporary building erected to house a temporary hypochlorite of lime treatment plant. All water was treated at this point.

A direct communication had been made between the Creek and collecting system, both through the perforated barrel and also along the upper side of the diverting wall beneath the bed of the Creek. The sodium salt of fluorescine (uranine) when placed in the perforated barrel appeared in the Lower Collecting Reservoir (550 feet distant) within 20 minutes. When placed in the Creek just above the diverting wall it appeared in the Upper Collecting Reservoir (35 feet distant) within 33 seconds.

Because of these direct connections between the Creek and the spring water supply, the history of the weather conditions and of previous typhoid fever on the watershed became of primal importance.

The history of weather conditions indicates that there was an unusual precipitation during the summer. This was followed by a drought period during the latter portion of August and the early portion of September. The West Branch of Sugar Creek is subject to quick rises and rapid falls, as is usual in deforested regions.

There was no local weather observer in or near Troy and it was necessary to study the records of the United States Weather Bureau as taken at Wellsboro, Tioga County, which is 28 miles west, at Elmira, New York, 25 miles north; at Towanda, Bradford County, 22 miles east; at Williamsport, Lycoming County, 50 miles south. These records show a rather remarkable correlation in the dates and amounts of precipitation; and the observations which bear a direct relation to the incidence of the epidemic are as follows:

	September 15-16	September 22-25
Wellsboro,	1.59 in.	1.96 in.
Elmira,	. 1.05 in.	2.38 in.
Towanda,	*0.45 in.	2.55 in.
Williamsport,	0.24 in.	2.38 in.

*4 hours.

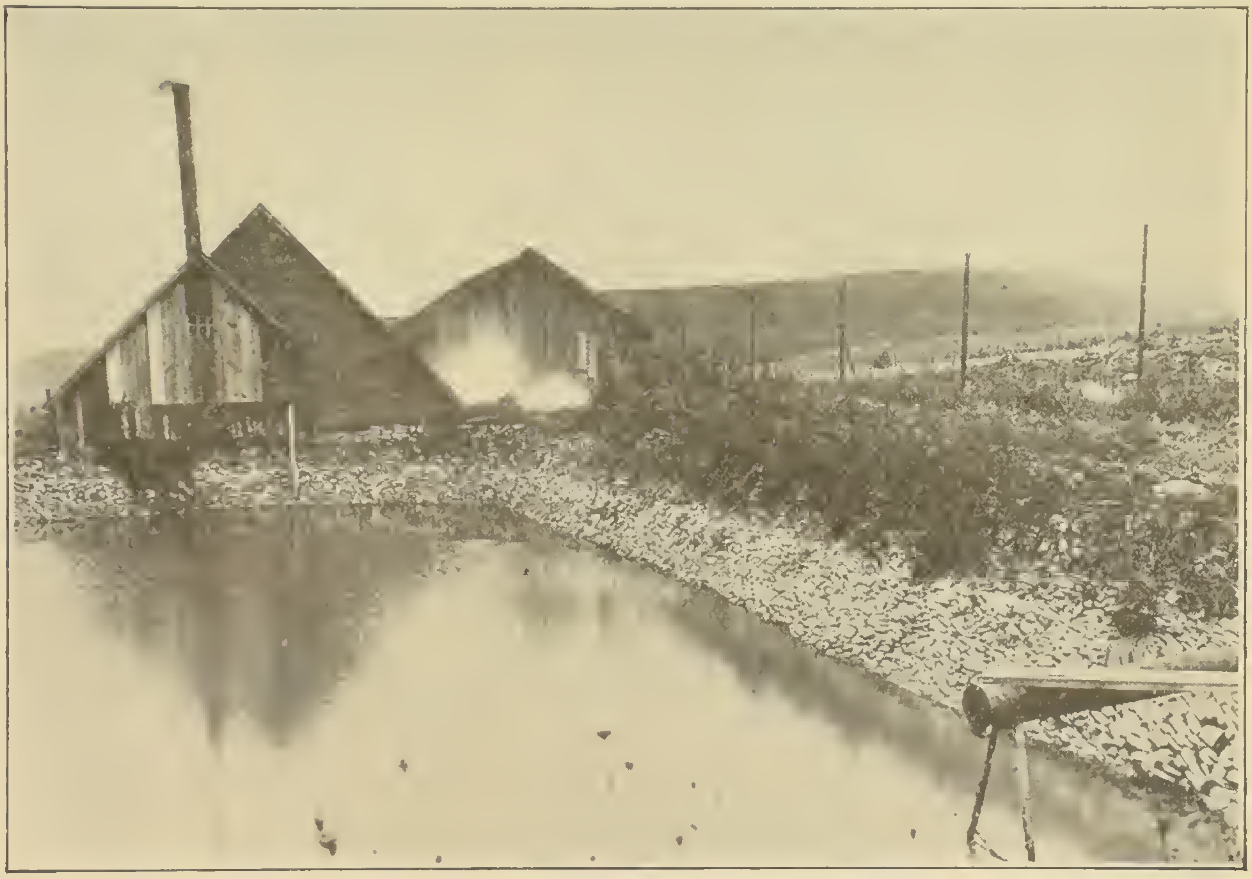


Fig. 4.—Open distributing reservoir and discharge pipe from collection system in the foreground. The pump station for drilled well at this point and the covered reservoir are shown in the background.

The average for each day during the month of September and early part of October shows a *curve of precipitation* with two principal apices occurring ten days apart. (Fig. 1.) It will be observed that the two highest points in the *curve of onsets* record two distinct periods of infection, the first occurring between 11 and 14 days after the maximum rain fall of September 15 and the second 11 to 14 days after the rain fall of September 22 to 25. In view of this history, a specific pollution of the Creek waters was suspected.

A study of the watershed above the point of collection of the Borough water supply gave a total population of 35 in an area of 3 square miles. There were 12 occupied premises, from which the following pollutions occurred; 7 privies, 1 cesspool and 27 miscellaneous sources, including pig-pens, barnyards and kitchen wastes.

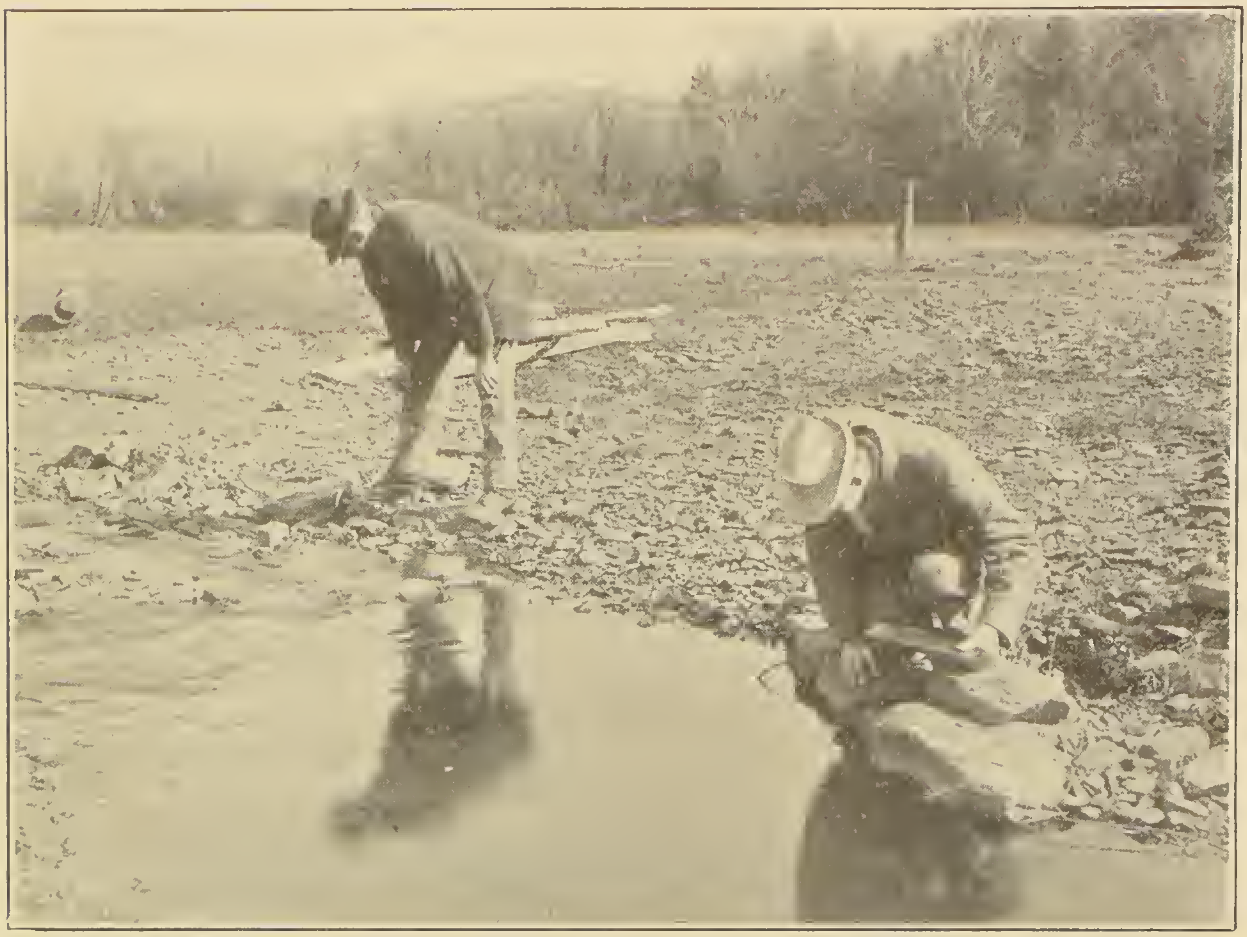


Fig. 5.—West Branch of Sugar Creek. Uranine, placed in a pocket near the large stones in the foreground, appeared in the reservoir within 33 seconds. The perforated barrel is located in the creek bed to the extreme left.

During the winter of 1911-12, there were 4 cases of typhoid fever in one family who lived on the banks of the West Branch of Sugar Creek, about 1 mile below the municipal source of water supply. One W. S., employed on that farm, was taken ill late in the month of February, 1912. His onset is officially recorded as March 4, on which date he returned to the home of his father who lived about one half mile above the Spring Lot on a small tributary to the West Branch of Sugar Creek, known as Spring Run. This patient was placed under quarantine immediately upon arrival; a trench was dug for the disposal of the excreta, all of which were thoroughly disinfected with fresh unslaked lime prior to burial in the trench. The trench was located adjacent to the privy vault, which was about 100 feet distant from and about 50 feet in elevation above the Spring Run. There is no evidence that storm water, except under extraordinary conditions, would cause drainage from these points into the stream. However, W. S. worked in the harvest fields through which Spring Run and a portion of the West Branch of Sugar Creek flow. During August and early September subsequently, he states that at times discharges were deposited in the fields adjacent to the stream. As this was the only authentic case of typhoid fever occurring on the

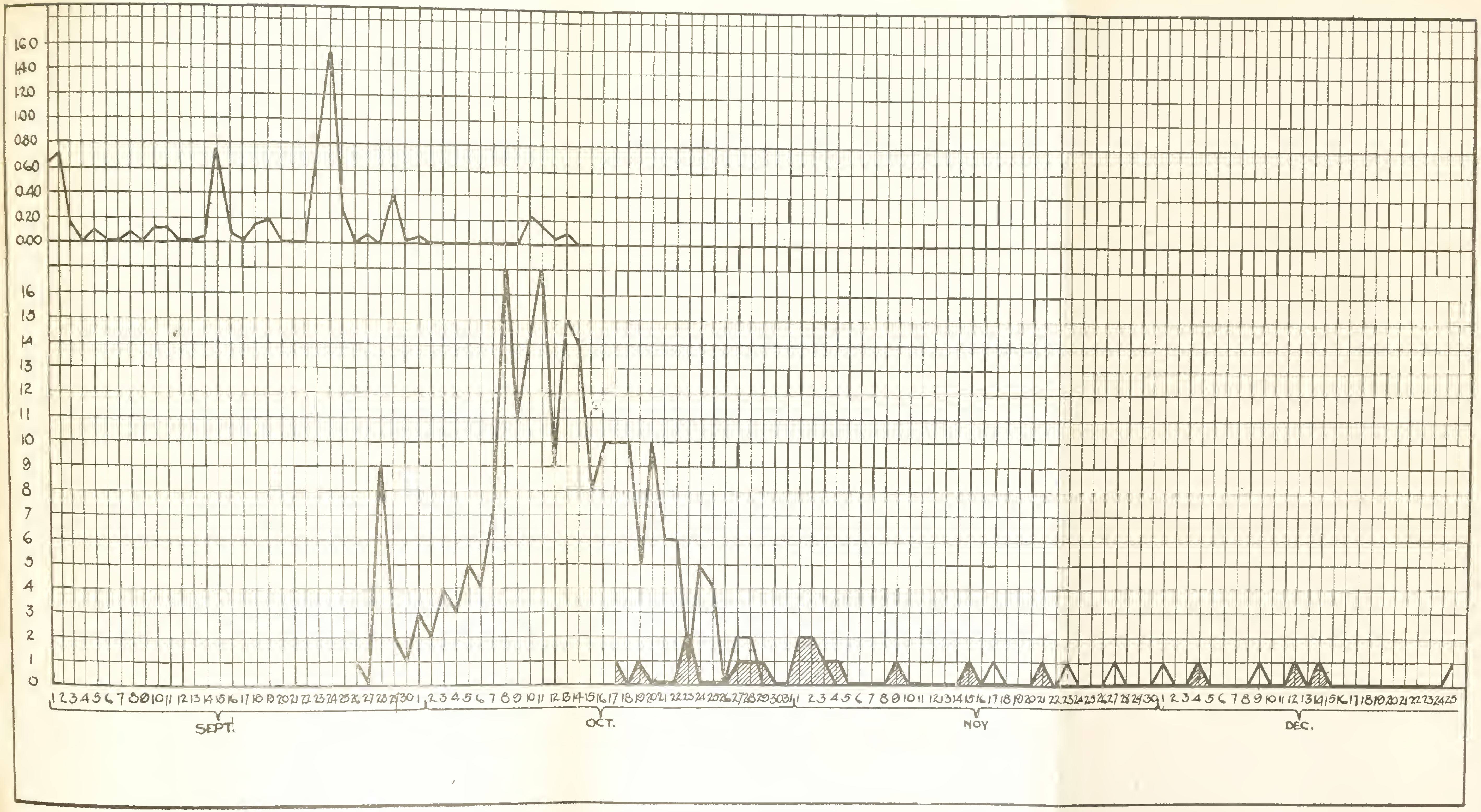


Fig. 6.—The upper curve shows the average precipitation in inches taken at four points of the compass and within a radius of 25 miles from Troy Borough. The lower curve shows the morbidity in relation to the precipitation curve. The shaded areas record the mortality.

watershed, specimens of feces and urine were collected on October 15, 1912, which after careful examination were proved to be negative. On November 12, additional specimens were procured, and from the feces, *B. Typhosus* was recovered and identified by all the required isomurtoric tests. The strain was subsequently used (because of its agglutinability) to study the sera of certain cases from the same epidemic.

The meteorologic history would indicate that had the source of infection been deposited earlier in the season, severe storms with heavy precipitation occurring during the months of July and August would probably have led to an earlier infection of the municipal water supply. During that period there was a maximum exposure to pollution of the waters in the reservoir. Extensive repairs and alterations had been made, the work beginning late in June and ending on or about September 10. During this period 14 men were employed more or less constantly and the hygiene of the workmen was neglected. However, it could not be learned that any had previously suffered an attack of typhoid fever, and the history of other abdominal disturbances was considered too vague to be reliable.

The analysis of the waters from the various points of supply was made immediately; representative analyses are noted in the following table:

	Total Bacteria per c. c.	B. Coli per c. c.
Raw water, W. Branch Sugar Creek,	240	2
Inlet pipe, Upper Collecting Basin, Spring Lot,	10,000	1
Inlet Pipe, Lower Collecting Basin, Spring Lot,	200	1
Lower Collecting Basin,	100	1
Inlet, Lower Collecting Basin,	720	2
Open Reservoir (Distributing),	60	2
Covered Reservoir (Distributing),	9,500	14
Up-Stream Drilled Well, Spring Lot,	300	0
Down-Stream Drilled Well, Spring Lot,	200	0
Spring No. 1, Spring Lot,	40	0
Spring No. 2, Spring Lot,	100	0
Spring No. 3, Spring Lot,	35	0
Spring No. 4, Spring Lot,	200	0
Drilled Well at Open Reservoir (Distributing),	20	0
P. R. R., Parsons' or Cases' Spring,	10,000	24
Taps:		
Elmira Street,	2,500	1
Canton Street,	1,500	1
Canton Street,	600	0
Troy Creamery,	50,000	0
Penn. R. R. Station,	12,000	0
Lower Elmira Street,	24,000	0

DIAGNOSIS.

The epidemiologic diagnosis as to the source of infection was based primarily on the explosive character of the epidemic, the use of an untreated water which had recently shown marked turbidity and the exclusion of milk foods, ice, ice-cream and flies as being possible means of transmission. This was confirmed by the discovery of a carrier case bearing a definite relation to pollution of the stream which was an incidental source of supply and by the occurrence of unusual precipitation prior to the onsets of all cases.

The individual diagnosis was in many cases more difficult to establish especially early in the epidemic when a large percentage of the cases were in the prodromal stage of the disease. It was not possible to establish a field laboratory in time to perform blood cultures on the many cases occurring daily; because of atypical onsets and to a certain extent, atypical clinical courses, many cases were not reported as typhoid fever until during the second week of temperature course. In consultation with the local physicians, a large proportion of the patients was studied and in 47 cases the titer limit of the blood sera was studied in relation to the following micro-organisms: *B. typhosus, B. para-typhosus A. and B., B. para-coli, B. enteritidis* (*Gaertner*) *and B. suisepticus.* In previous epidemics in Pennsylvania these forms had been recovered from water supplies and feces; infection by them had been confirmed by positive agglutination reactions. 16 of the 47 cases studied in Troy showed the presence of agglutinins for *B. enteritidis* (*Gaertner*) during the entire course of illness and were negative to all other micro-organisms.

For purposes of sanitary supervision all cases infected by any member of the typho-colon group as diagnosed serologically were included under the general epidemiologic diagnosis of typhoid fever.

The only pathogenic member of the typho-colon series which was recovered from the Troy water supply was a form identical in its bio-chemical behavior with the original Gaertner form of *B. enteritidis.* This micro-organism was recovered from samples of water collected especially for the purpose from the distributing reservoirs. Several strains of *B. coli* were recovered from other sources of the water system.

MORTALITY.

The mortality was 19 or 8.19 per cent. This is an unusually low mortality; in similar water-borne epidemics in Pennsylvania the mortality has ranged from 10 per cent. to 14 per cent. The case morbidity (as noted above) was 17.27 per cent. In other words, this epidemic presents a high case morbidity with a low case mortality. This may be accounted for by a high susceptibility in the residents and the absence of industrial disinfectants, as wastes in the source of water supply. The first reasonable suggestion is that the particular strain of *B. typhosus* was of reduced virulence. While definite conclusions cannot be made to account for the low mortality it must be born in mind that the particular bacilli would undergo certain modifications in virulence during the 6 to 8 months of invironment in one host.

TREATMENT.

Physical conditions. Having established a tentative diagnosis on the day of arrival, measures were taken to eliminate infected waters. It was advisable to cut out from service the Pennsylvania Railroad spring supply because of the physical evidences of barnyard pollution, which was confirmed subsequently by bacteriological analysis. Temporarily, the service from all points except the drilled well located at the distributing reservoirs was discontinued.

The water in both reservoirs was treated with copper sulfate solution in the proportion of two parts per million gallons. This treatment was continued over a period of nearly two days, by which time a temporary plant for treating with hypochlorite of lime was put into service (Figure 4.) The distributing reservoirs were disinfected on October 16 and again on October 19, with copper sulfate solution and subsequently washed out with treated water. At the same time the street mains were flushed, all dead ends and taps being opened until the water showed the presence of hypochlorite of lime at all points. The water supply from the Spring Lot, including the Creek waters, was discontinued as soon as the reservoir and service lines had been thoroughly disinfected and the treatment plant established. The use of hypochlorite of lime has been continued to this date without the occurrence of new cases and pending the submission of plans by the engineer employed by the Borough.

Vaccine. After the preliminary analysis had been made on October 13, the local Board of Health and physicians were advised to use anti-typhoid vaccine for the prevention of secondary cases. This suggestion was immediately followed, and those who were not inoculated by the family physicians were offered free vaccination at stations established by the Borough authorities. Physicians from neighboring points offered their services free of charge, and in co-operation with the local and State Department physicians, 761 persons or 56.66 per cent. of the total population (all exposed to the infection) received the vaccine.

A mixed vaccine, with the following formula, was used:

	Syringe 1.	Syringe 2.	Syringe 3.
Bacillus typhosus,	500	1,000	1,000,000,000
Bacillus typhosus A,	250	500	500,000,000
Bacillus typhosus B,	250	500	500,000,000

The organisms used were strains in use in the United States Army Laboratories. The inoculations were given every 9 or 10 days.

Of the 1,343 persons exposed to the infection, 761 or 56.56 per cent. persons received inoculations, while 582 or 43.32 per cent. persons were not vaccinated. If the total number of persons exposed after deducting 127 persons already sick is used as a basis, 62.5 per cent. of the apparently well at the time of first inoculation received vaccine.

Age and Sex: The age period showing the greatest number of persons vaccinated was between 15 and 35 years. The wide latitude of susceptibility is shown by the ages of those who were ill, ranging from 2½ to 84 years. The ages of those vaccinated conformed to this wide range of susceptibility, the youngest being 1½ and the oldest 79 years.

373 or 49.2 per cent. were males, while 388 or 50.8 per cent. were females.

Morbidity and Mortality of the Vaccinated: The first inoculation was given on October 14 and the third on November 3. Between these dates, 35 of the 37 onsets in vaccinated persons occurred at varying periods. The incubation period of those last infected corresponds to the limitations of these same dates, that is, November 4. The clinical evidence of typhoid fever in the 37 vaccinated persons occurred in 28 persons between the first and second inoculations.

The clinical features in 19 cases were studied in order to determine the value of the vaccine as an agent in modifying the courses of the disease. The special features are:

1. *The Onsets*: This was prolonged in every case; the apparent acceleration of onset was the appearance of recognized temperature (which became continuous) shortly after vaccination in a majority of the cases. However, the history of every case included subjective symptoms of a prolonged prodromata, somewhat accentuated after inoculation.
2. *The Type of Temperature*: There was no apparent modification: in all cases it was of continued type and the regular morning remission was noted in the majority; the defervescence was by lysis.
3. *The Duration of Illness*: The average for all not having a relapse was 28 days, the shortest 21 days, the longest 31 days.
4. *Relapse*: This occurred in 6 or 31.5 per cent. in 1 case the entire period of illness lasted over 100 days.
5. *The Complications*: Among these may be mentioned the effect on the nervous system, 5 showing marked delirium. Acute nephritis followed in 2 cases; this cannot be accounted for by reason of previous nephritis or any other factor than the present illness. Intestinal hemorrhage occurred in 3 cases, thrombosis and phlebitis in 2 cases, and a lobar pneumonia in 1 case.
6. *The Mortality*: There was but 1 death of those vaccinated, a mortality of 0.27 per cent. This patient, a female, aged 17 years, received one inoculation on October 18. Date of onset, October 21; the patient was confined to bed November 5, pneumonic dullness, lower lobe, right lung, November 21. In contrast with this there were 17 deaths among the unvaccinated, a mortality of 8.85 per cent. The case mortality during the entire epidemic was 8.19 per cent.

The 2 cases developing typhoid fever after the end of the incubation period (for all infected cases) are of importance. The first case, E. A., female, aged 27 years, graduate nurse, received the first inoculation on October 25 and the second on November 4. The first subjective evidences of the disease were noted on November 5. This was followed by the development of temperature which ran a normal course, subsiding by lysis to normal on November 25. The recrudescence appeared on December 1 with a temperature course lasting for 2 weeks. The patient gave the usual history and clinical picture of typhoid fever. It is altogether probable that this patient was infected just prior to the disinfection of the water supply; she may have been a secondary case, although there are reasons to exclude the latter factor.

The second case, H. B., a male, aged 29 years, is of greater interest. He received his first inoculation on October 16, the second on October 26 and the third on November 10. The onset of temperature occurred 8 days later, November 18, and ran the usual typhoidal course, returning to normal by lysis on December 4. During the course of the disease he suffered slight intestinal hemorrhage, but there was no other evidence of complications, and recovery was uninterrupted and complete. He had typhoid fever in 1902.

Even if the incubation period had been the maximum of 30 days noted in a small percentage of cases, his onset would date 4 or 5 days subsequent to the abatement of the source. Regardless as to what time and where he acquired his infection, the development of the disease in its typical form, occurring 8 days after the third inoculation, would suggest that antibodies had not been created in sufficient amounts to give protection.

Relation of Time of Vaccination to Morbidity: Of the 232 cases, 127 developed the disease prior to October 14, the date of the first inoculation, and 106 became ill subsequent to that date.

The morbidity in relation to the total number of persons vaccinated and unvaccinated shows:

Number of persons vaccinated, ...	761
Number of persons vaccinated but developing the disease, ...	27 (or 4.86%)
Number of persons not vaccinated, ...	582
Number of persons not vaccinated developing typhoid fever prior to October 14,...	127
Number of persons not vaccinated and well prior to October 14, ...	455
Number of persons not vaccinated developing the disease subsequent to October 14,	68 (or 14.94%)

That is, of all persons who remained well up to and including the date of first inoculation, 4.86 per cent. of the vaccinated and 14.94 per cent. of the unvaccinated developed the disease. This would seem to indicate that vaccine is of great value in reducing epidemic morbidity. However, over 58 per cent. of those becoming ill after October 14 (the date of first inoculation) showed onsets within 5 days. 35 of the 37 vaccinated persons became ill within the usual incubation period after exposure. Further, it should be noted that the usual morbidity in water-borne epidemics varies from 2 per cent. to 10 per cent. of the population. That portion of the morbidity occurring prior to the first inoculation was 9.45 per cent. and only 12 (or 0.05 per cent.) cases became ill after the end of the incubation period; 10 of these were secondary.

It seems to demonstrate that vaccine administration after the infecting agent has been ingested does not lower the morbidity nor modify the individual case. Hence, the conclusion is formed that some other factors are of importance in determining the value of vaccine in an epidemic-namely: the time, degree, and continuance of pollution and the broader problems of susceptibility of the exposed and the virulence of the infecting micro-organisms. It would not seem advisable to depend too much upon the use of vaccine until these factors had been considered, while its use should be encouraged.

Domestic Hygiene: Through the active cooperation of the local physicians and the ready acquiescence of every resident of the Borough, every patient was isolated. Concurrent disinfection of all discharges, of all bed linens and clothing, of all utensils and the attendants' hands was effectually carried out. Arrangements were made with the laundry in the Borough not to accept clothing or bed linens coming from known infected homes unless such pieces of laundry were first boiled and disinfected. All milk routes were placed under sanitary supervision, and no containers were permitted to be removed from premises in which the disease existed. Warning placards and circulars were distributed throughout the town, instructing the residents not to drink water which had not been boiled for at least 30 minutes. The same type of warning was printed in the local newspaers and in newspapers issued from nearby points but having a circulation in the Borough. Circular, Form 2, issued by the Department, was placed in the hands of every householder, giving detailed instructions on sick room hygiene.

Emergency Hospital With the consent of Borough Councils, the local Board of Health obtained a two story private dwelling to use as an Emergency Hospital. To this was added the second story rooms of the Troy Engine House as an annex. Only those were admitted in whose homes the sanitation of the sick room could not be carried out in detail or who were in such financial condition that assistance was needed. All who were admitted were seriously ill. All patients remained under the charge of the family physician. There were 49 admissions with 4 deaths, a mortality of 8.2 per cent. The Hospital was closed on December 12, 1912, after being in operation 59 days.

District Nurse Service: With the assistance of local philanthrophy and particularly through the officers of the local Visiting Nurses' Organization, an efficient district nurse service was inaugurated. When necessary each patient was visited two or three times a day or a nurse remained on duty for long periods of time in cases where there was need of prolonged assistance.

Financial Assistance: A Relief Committee was organized to help those who needed assistance, and contributions were received from many points in Pennsylvania and New York. This organization was placed under the management of a sub-committee, a distributing station was opened, and a careful record was kept of all monies and supplies received and distributed. From the first day of its organization no assistance was rendered without a hasty but careful investigation as to the need. There is no doubt but that the relief from mental distress on the part of many of the wage earners contributed to their eventual recovery without serious complication, and it would appear from the experience in Troy that such sociologic measures are an important factor in limiting an epidemic and in reducing the mortality.

COST OF THE EPIDEMIC.

This statement is an enumeration of the available figures. For obvious reasons it was not possible to secure a correct account of every expense incurred. The expense for medical attendance, medicine, nurses, special foods and sick room supplies could not be correctly determined and is not included. Under Item 1, the monies and supplies handled by the Relief Committee is given in flat figures, which are somewhat below the final balances recorded on the Committee's books. The actual loss in wages of 54 persons (Item 5) is a correct statement of losses from this source. It should be recalled that the majority (over 60 per cent.) of those who had typhoid fever were not wage earners. Those whose income was not affected by illness have been eliminated. The 54 wage earners were absent from work during a period of 580 weeks or over 11 years, an economic loss to the community which can scarcely be compensated for during a like period of time.

The cost for maintenance of the Emergency Hospital was $7,272.78. This institution was open for a period of 59 days during which 49 patients were admitted. The total rate per patient for its maintenance was $148.40, while the maintenance rate per patient per diem was $2.52. This is a higher rate than is usual in permanent institutions but is low in relation to the nature of the disease and the emergency need.

The total cost to the Borough in available figures is $28,086.56. This includes the item charged to the Bradford County Poor District, as it is usual for an Emergency Hospital to be maintained by the municipality in which the epidemic occurs. It does not include items incidental to treatment, nor the private contributions to the fund of the Relief Committee. A careful estimate of the actual cost to the Borough indicates that the epidemic must have been well over $50,000.00. Contrasted with this the cost of installing a complete system for a supply of pure water has been fixed at $22,997.00 or had a temporary treatment plant been put into service, the total cost, including equipment and housing, would not have exceeded $100.00 or a more permanent plant of the same type could have been installed at a cost of from $500.00 to $600.00.

If these figures are the actual economic loss it is nevertheless to be ranked as a great catastrophe. However, to the available figures are to be added the absence of 80 students from attendance in public schools, the physical complications which incapacitated a certain percentage for varying periods. the creation of from 2 to 4 per cent. of typhoid bacilli carriers (4 to 10 persons) who will continue to transmit the cause of the disease for periods ranging from 6 months to 40 years, and the inestimable wastes represented in the 19 deaths occurring during the course of the epidemic. On the basis of the average value of a life, as fixed by Irving Fisher at $1,700.00, the annual preventable loss of potential earnings would be $32,300.00. There was a wide variation of occupation and age among those who died and the loss of a number of prominent persons increases the average loss for the entire group. Using Fisher's tables, the minimum worth at different ages would be as follows:

7 years,	1	$1,350 00
15 years,	2	6,000 00
17 years,	2	6,800 00
18 years,	1	3,600 00
24 years,	1	4,050 00
29 years,	1	4,100 00
37 years,	2	7,200 00
41 years,	1	3,350 00
44 years,	1	3,000 00
48 years,	1	3,000 00
52 years,	2	5,600 00
62 years,	1	2,100 00
65 years,	1	2,000 00
66 years,	1	2,000 00
68 years,	1	1,800 00
	19	$55,950 00

Item 1. Relief Committee.			
Cash received and disbursed,		$16,000 00	
Supplies (canned goods, linens, etc.),		4,000 00	
			$20,000 00
Item 2. Emergency Hospital.			
(1) Bradford County Poor District.			
Nurses,	$2,229 13		
Orderlies,	551 81		
Doctors,	1,040 91		
Groceries, fruit, drugs, etc.,	3,014 65		
		6,836 51	
(2) Troy Borough,		168 82	
(3) State Department of Health (expenses of 2 supervising nurses),		267 42	
			7,272 78

Item 3. Troy Borough (other than Hospital).		
Special Health Officer,	$121 20	
Antityphoid Vaccine,	414 00	
Miscellaneous,	125 00	
		660 20
Item 4. State Department of Health, traveling expenses of field officers, board and lodging, laboratory expenses and expressage,		1,504 36
Item 5. Loss in wages of 54 wage earners,		9,286 00
Item 6. Estimated total decrease in trade of $52,450.00, occasioning an estimated loss in profits of,		10.1[illegible]5 00
Item 7. Estimated minimum value of lives lost,		55,950 00
		$104,809 34

HEALTH BULLETIN SCHEDULE.

No.	Issue.	Subject.
1.	July, 1909,	Disease-Breeding Power of House-flies and Methods of Prevention.
2.	Aug., 1909,	Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, etc.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be Avoided in the Daily Fight Against Tuberculosis.
8.	Feb., 1910,	Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Penna. The Results of Four Years' Work of the Department.
10.	April, 1910,	Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly, How it Develops, why it must be Destroyed and How to Destroy it.
24.	June, 1911,	Effects of Tubercle Products on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911.	Organization of the Penna. State Dept. of Health.
27.	Sept., 1911,	Tuberculosis in the Country as well as in the City. A Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biologic Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from, etc.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects.
33.	Mar., 1912,	The Opportunity for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912.	Drowning.
36.	June, 1912.	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Dr. Dixon's Address at Duquesne, Pa. Conservation of Health.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	The Tuberculosis Nurse under State Direction.
44.	Mar., 1913.	The Relation of the Undertaker to Public Health.
45.	April, 1913.	What State Control Over Streams Has Done in Pennsylvania in Seven Years.
46.	May, 1913,	Troy Typhoid Fever Epidemic.
47.	June, 1913.	
48.	July, 1913.	
49.	Aug., 1913.	
50.	Sept., 1913.	
51.	Oct., 1913.	
52.	Nov., 1913.	
53.	Dec., 1913.	
54.	Jan., 1914.	
55.	Feb., 1914.	
56.	Mar., 1914.	
57.	April, 1914.	
58.	May, 1914.	
59.	June, 1914.	
60.	July, 1914.	
61.	Aug., 1914.	
62.	Sept., 1914.	
63.	Oct., 1914.	
64.	Nov., 1914.	
65.	Dec., 1914.	
66.	Jan., 1915.	
67.	Feb., 1915.	
68.	Mar., 1915.	
69.	April, 1915.	
70.	May, 1915.	
71.	June, 1915.	
72.	July, 1915.	
73.	Aug., 1915.	
74.	Sept., 1915.	
75.	Oct., 1915.	
76.	Nov., 1915.	
77.	Dec., 1915.	

P416h

APR
30
1914

PENNSYLVANIA

Health Bulletin

No. 47. HARRISBURG, PA. JUNE, 1913.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

THE REGISTRATION OF VITAL STATISTICS A SOCIAL SERVICE.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 47. HARRISBURG, PA. June, 1913.

THE REGISTRATION OF VITAL STATISTICS A SOCIAL SERVICE.

The legislative enactment of May 1, 1905, which provided for the registration of births, deaths, marriages and communicable diseases as a function of the State Department of Health, committed the Commonwealth to a fundamental social service directly affecting the primary units of its population. In no other capacity does the State come into such close intimacy with its individual citizens as through an official record of the important events in their lives, and no other official relationship contains so much of direct mutual indebtedness.

It has been a long accepted expression that the wealth of a nation reposes in its people and that the wealth of a people endures through its health. This is not by any means a new dictum in the realm of social or political economics, but it is beginning to receive a new application in the constructive thought and action which is reflected in the extension of governmental functions to include many of those things which had heretofore been regarded as individual responsibilities and purely personal in character.

The term "health" has grown into a much wider significance than it formerly possessed. The ills of mankind have become social, economic, evironmental, as well as physical, and through the refinement of our growing knowledge we have learned that the texture of our social fabric depends upon the soundness and fitness of the individual fibers of which it is composed; and so the individual rather than the community is being recognized as the unit which must be served and reckoned with in any effort looking to human progress and betterment.

Vital statistics is the classification of definite facts relating to fixed events in human life. Birth, parentage, marriage, occupation, disease and death are all fixed events which permit of classification, correlation and numerical analysis. In any study of the influences which promote or destroy the happiness, efficiency or duration of human life, we must certainly bring together events in the form of facts common to many, if our conclusions are to be of any great value or service. The enumeration of these facts in individual instances at the time of their occurrence, in a uniform manner, and their return to a central bureau where they will be permanently preserved, constitute what is known as the "registration of vital statistics."

Such registration records of births, deaths, and marriages have a dual value. First, the value of the individual record to the individual and, second, the value as a contributing unit in a statistical study of humankind in general, and of the community or state in special.

In the absence of an authentic official record of birth, it has not infrequently happened in the past that serious injury has been done to individuals through their inability to legally establish their identity and relationship. The inheritance of property and the rights to exercise the functions of citizenship are safeguarded to the individual by the official registration of his birth. The effectual enforcement of laws which prescribe the period of life that shall be given over to education and which limits the age when employment may be entered into, depends very largely upon complete birth registration. With every birth recorded at the time of its occurrence by those who are in a position to notate the facts concerning it, it will no longer be possible to deprive the child of its educational opportunities and to thrust it prematurely into industrial life by age misrepresentation. With birth registration, doubt as to the age of consent on the part of females can no longer be an open door to the escape of ravishers.

From a statistical standpoint birth registration affords the opportunity of an actual survey of the sources from which our population is being renewed. We are able to judge not only quantity but quality, and to legislate and act wisely concerning the future of our helpless and immature. A high citizenship finds its inception in a pride of birth that is shared alike by Nation, State and individual. Children are no longer the exclusive property of their parents; they belong to society, in which they must ultimately take their places and help to work out the destiny of a whole people. Even the child born out of wedlock is beginning to receive thoughtful consideration through birth registration and we are learning to transfer the stigma of "illegitimacy" from innocent offspring to guilty parents.

In Pennsylvania during the past year there were registered 204,395 living births, which gives to the State a birth rate of 26.0 per 1,000 of the entire population. Owing to the recency of the operation of the present registration law, we are unable to trace the birth rate of Pennsylvania over a very extended period of years. The rates for the seven years from 1906 to 1912, inclusive, were as follows:

1906,	23.4
1907,	24.1
1908,	26.2
1909,	26.1
1910,	26.5
1911,	26.2
1912,	26.0

The increase from 1906 to 1908 does not represent an increase in the actual birth rate nearly so much as it does represent an increase in the accuracy of birth registration, which was accomplished through extraordinary effort in the form of education, personal investigation and prosecution.

The task of securing the registration of every birth that occurs, where so much depends upon the prompt and cheerful compliance with the provisions of the law on the part of individual physicians, midwives and parents, calls for the most energetic and constant effort. It is believed that the records in Pennsylvania for the years 1908 to 1912 represent at least 95% of completeness.

The United States stands practically isolated from the civilized nations of the world in the matter of birth registration, and it is evident that it will require some years of gigantic effort before we can assume a place among those nations which for many years have thus established the individuality of their citizenship.

There is little doubt that the civilized world has experienced over a long period of years a gradual decline in the birth rate. The social importance of this was widely discussed in the year 1900 after the birth rate of France had during five years of the previous decade fallen below the death rate. The changing birth rates in a number of the principal countries for the thirty-year period from 1881 to 1910 illustrates very forcibly that the decline in the proportion of children born is not limited to any one nationality but is rather worldwide in its incidence. The birth rates and the extremes of fluctuation for the most prominent of these countries are as follows:

	1881.	1910.	High.	Low.
England and Wales,	33.9	25.1	33.9	25.1
Scotland,	33.7	26.2	33.7	26.2
Ireland,	24.5	23.3	24.5	22.3
Australia,	35.3	26.7	35.7	26.2
Denmark,	32.2	27.5	33.3	27.5
Norway,	30.6	26.1	31.6	26.1
Sweden,	29.1	24.8	30.0	24.8
European Russia,	47.8	44.8 (1905)	50.4	44.8
German Empire,	37.0	31.1 (1909)	37.2	31.1
Austria,	37.5	32.5	38.9	32.5
Hungary,	42.9	35.7	45.6	35.7
Servia,	45.7	36.5 (1909)	47.6	36.5
The Netherlands,	35.0	28.6	35.3	28.6
Belgium,	31.8	23.7 (1909)	31.8	23.7
France,	24.9	19.7	24.9	19.6
Switzerland,	29.8	25.5 (1909)	29.8	25.5
Spain,	37.1	33.1	37.1	33.1
Italy,	38.0	32.9	39.0	31.5
Chili,	46.2	38.4	46.2	25.8

It would appear from an examination of the registration records which have been maintained for a long period of years in some of our American commonwealths that the birth rate, while never so high as in some of the foreign countries mentioned, has undergone a similar but not so extensive decline. There is also no doubt that the greatest factor in maintaining a relatively constant birth rate has been continuous immigration from those European countries with naturally high rates.

A study of the birth rate among the foreign born as compared with those of one, two or three generations of native born ancestry reveals the fact that the aliens of Europe rapidly lose their natural reproductivity under American influences. The recent monograph on "The Fecundity of Immigrant Women" prepared for the report of the National Immigration Commission brings to light some very important data upon this subject.

The inquiry was limited to 78,432 women under forty-five years of age, who had been married from ten to twenty years. It was found among this number that 7.4 per cent. had borne no children, and among those of native parentage 13.1 per cent. and among those of foreign parentage only 5.7 per cent. had borne no children. Among the latter those of the first generation had 5.3 per cent. childless and of the second generation 6.3 per cent, the difference of one generation making a difference of 1 per cent. in the number of childless married women. The women of native parentage had each borne 2.7 children, while those of foreign parentage had borne 4.4. The average married life of the women under consideration was 14.1 years and the number of years of married life to each child was 3.5. This may be considered as the childbearing rate of women under forty-five who had been married from ten to twenty years. The women of one generation of native parentage had had one child for every 5.3 years, while the women of foreign parentage had had one in every 3.2 years.

There are doubtless some underlying causes more or less artificial in their nature which are responsible for these changing conditions surrounding the renewal of the human family. An accurate and complete birth registration will surely help us to know how far and to what extent these changes are affecting our social structure and perhaps enable us to supply some remedies before the situation has become so acute as to endanger the future of our people.

In addition to the living children mentioned as registered during the year, the birth of 8,081 stillborn children which had entered the period of uterine viability were recorded, together with all of the statistical facts associated with them. Whereas a stillborn child neither adds to nor takes from the living population, yet there are many facts surrounding it which are worthy of serious consideration. While the application of the term "stillborn" to those impregnations which have passed the fourth month of gestation excludes in a very large degree the wilful destruction of the product of conception at earlier periods, it does present a striking picture of the true accidents of pregnancy which in many instances bear a close relationship to occupational, social and environmental, as well as inherited influences. As every stillborn child helps to exhaust the reproductive resources of the mother, it represents a very definite loss in the renewal possibilities of our population, and the facts we are learning concerning this thwarted attempt of Nature will undoubtedly convey the lesson to the social inquirer of the importance of education, care and interest in the prenatal life of children.

The registration of marriages is an important corollary to the registration of births and is also of dual value. The rights of the contracting parties and their issue are legally and permanently conserved. The importance of a central bureau in which all marriages consummated throughout the Commonwealth are recorded, is in Pennsylvania emphasized by the conditions under which the ceremonies are authorized. Under existing laws licenses are issued by the courts of the several counties. A license issued in one county of the State is valid in any other county, and without a central registration bureau, an attempt to establish a marriage might very readily result in a search through the records of the entire sixty-seven counties. From a statistical standpoint the registration of marriages, which embraces the important items of age, color, nativity, occupation of both bride and groom and the fact of previous marriage and of the nature of its dissolution, all combine to establish a basis for a study of the various conditions which surround one of the most sacred observances of modern civilization.

The number of persons married in proportion to the total population of marriageable age has been found to bear such a close relation to the industrial prosperity of a country that for years the ratio of marriages occurring in Great Britain was found to be as reliable an index of the commercial conditions as the value of the products grown from the soil. The fluctuation in the price of wheat over a very long period of years was found to run very closely parallel to the proportion of marriages, which increased when the price rose and decreased when it fell.

The entrance of women into self-supporting occupations has gradually advanced the average age at which they marry. In Pennsylvania during the past year among 65,081 marriages the average age of brides at first marriage was 22.2 and of grooms 25.2 years. As the period of greatest fertility in a woman's life is confined to the ages between eighteen and thirty, it can readily be seen what a tremendous influence the postponement of marriage has upon the natural limitation of the number of children born to each mother.

The marriage rates as indicated by the number of persons married in each 1,000 of the total population in Pennsylvania for the years 1906 to 1912, inclusive, are as follows:

1906,	17.1
1907,	17.0
1908,	15.3
1909,	15.9
1910,	16.2
1911,	15.9
1912,	16.3

It might very naturally be supposed that a declining birth rate would find its explanation in a declining marriage rate. That such is not the case is shown by the marriage rates and the extremes of fluctuation for the foreign countries previously mentioned for the same yearly periods, which are as follows:

		1881.	1910.	High.	Low.
	England and Wales,	15.1	15.0	16.5	14.2
	Scotland,	13.9	13.0	15.0	12.6
	Ireland,	8.5	10.1	10.5	8.4
	Australia,	15.2	16.7	16.7	12.2
	Denmark,	15.6	14.6	15.6	13.5
	Norway,	12.9	12.4	14.2	11.6
	Sweden,	12.4	12.0	13.3	11.3
(1905)	European Russia,	18.8	15.6	18.8	15.2
(1909)	German Empire,	14.9	15.5	16.9	14.9
	Austria,	15.9	15.1	16.6	15.0
	Hungary,	19.9	17.3	20.9	16.2
(1909)	Servia,	23.7	18.7	34.3	16.6
	The Netherlands,	14.6	14.3	15.4	13.8
(1909)	Belgium,	14.3	15.3	17.4	13.5
	France,	15.0	15.8	16.1	14.0
(1909)	Switzerland,	13.6	14.9	13.6	15.7
	Spain,	12.7	14.2	17.5	11.0
	Italy,	16.2	15.5	16.6	13.8
	Chili,	15.4	11.5	15.4	4.4

It will be noted that the high and low birth rates correspond very closely to the individual years considered, while the marriage rates vary considerably and in several of the countries are higher in 1910 than they were thirty years previously.

Upon the registration of the deaths rests the whole structure of effective sanitary administration. To the individual the value of the registration of a death is perhaps secondary to its public benefit. It was not until we began to realize through the registration of deaths the economic value of human life, and until we began to speak of death in the ordinary terms of commercial usage, that we developed a general appreciation of economic loss through death in the early age periods, and from preventable causes.

The good business man tests his commercial stability by a frequent balancing of his assets against his liabilities, and when we began to speak of vital statistics in definite terms of profit and loss, in which life was credited as an asset, death as a loss, and disease as a liability, we established a scheme of vital bookkeeping, just as applicable to a community, State or Nation as to an individual or a corporation.

This has been termed a commercial age, and one undeniable bit of evidence as to the proof of this application is to be found in the coincident awakening of public interest in affairs of public health when the terms of everyday commercial practice were applied to the business of preventing human suffering and prolonging human life.

We know beyond any shadow of a doubt that the effort expended in public health affairs has resulted in definitely relieving human suffering, promoting human efficiency and prolonging human life, and we know this only through the medium of vital statistics. It is as surely a measure of effort in this respect as the yardstick is in material matters.

The certificates of 111,842 persons who died in Pennsylvania last year, containing the cause of death, the essential personal and statistical particulars associated with the identity of the individual, and the circumstances and cause of death are recorded in the Central Bureau in Harrisburg.

From the wealth of information contained upon these certificates, we are able to draw definite conclusions concerning the causes which tend to destroy life at certain age periods, in definite occupations and in restricted localities, and it is largely from knowledge gleaned from these sources that 15,000 fewer persons now die each year in Pennsylvania in proportion to the total population than passed away eight short years ago.

This direct saving in life is but a fraction of the total harvest gleaned from the field of effort directed to the conservation of our people. Fatal illness represents in the course of a year but a small proportion of the actual incidence of disease.

To demonstrate the personal value of effective health work is a negative proposition. It is not easy to convince the individual that his freedom from sickness may have a direct relation to organized public effort of which he has been individually unconscious. He more readily voices tribute to good "Fortune" or his own superior wisdom.

Personal appreciation and loyalty to the interest of a State in the individual welfare of its people must come slowly through an education which carries the mutual thought of individual importance and responsibility.

Since the creation of the Department of Health in 1905, and including the year 1912,—1,350,210 living births, 796,461 deaths, and 421,236 marriages have been recorded, indexed and permanently preserved in the Central Bureau of Vital Statistics. This is the beginning of Pennsylvania's great "Dooms-day" book in which her humblest as well as her proudest citizen may find alike his place preserved.

Let us trace the record of Pennsylvania during the past seven years, not in the form of death rates per 1,000 of population for each of those years, but by taking the death rate of 1906 and applying it to each of the succeeding years and thus see the actual number of lives saved to the State:

1907 Saved,	507	as compared with 1906.
1908 Saved,	6,439	as compared with 1906.
1909 Saved,	9,829	as compared with 1906.
1910 Saved,	2,986	as compared with 1906.
1911 Saved,	13.018	as compared with 1906.
1912 Saved,	15,876	as compared with 1906.
Total,	48,655	

The registration of births, deaths and marriages does not, however, exhaust the statistical activities of the State's health work. An annual study of more than four hundred thousand children in our rural schools reveals the fact that three out of four are suffering from defects which inevitably retard their mental and physical development.

The State cannot afford to ignore these handicaps upon those who are just entering the race of life, and no stronger plea can be presented for the continuation and extension of the present remedial efforts than is contained in the mute but eloquent statistics concerning her school children. So, too, the statistical study of tuberculosis with all its associated social and economic elements broadens our vision and stimulates our activities.

One by one the problems of modern life are being submitted to scientific inquiry and analysis.

Vital statistics is indeed a fundamental social service. It lies at the very foundation of social progress. It contains the secret of lengthening life's stream, of broadening its channel and of raising the level of its flow.

P416h

APR 30 1914

PENNSYLVANIA
Health Bulletin

No. 48. HARRISBURG, PA. JULY, 1913.

Entered as second class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

WITHDRAWN

PENNSYLVANIA'S EUGENIC MARRIAGE LAW

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

PENNSYLVANIA

Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 48 HARRISBURG, PA. July, 1913

PENNSYLVANIA'S EUGENIC MARRIAGE LAW.

AN ACT

Regulating the issuance of licenses to marry; prohibiting the issuance of such licenses to certain persons; regulating the time during which licenses shall be valid, and the time when returns shall be made of marriages solemnized to the clerk of the orphans' court; and prescribing the duties of the clerk of the orphans' court.

Section 1. Be it enacted, etc., That no license to marry shall be issued except upon written and verified application to the clerk of the orphans' court. Such application shall contain a statement of the full Christian name and surname, color, occupation, birth-place, residence, and ages of the parties; whether the marriage contemplated is the first, second or other marriage; and that neither of the contracting parties is afflicted with a transmissible disease; together with the full Christian name and surname, residence, color, occupation, and birth-place of their parents, including the maiden name of the mother; together with such other facts as may be necessary to determine whether any legal impediment to the proposed marriage exists. Such application shall be recorded by the clerk, together with the license and certificate of marriage, in a book provided for that purpose, which book shall be a public record.

Section 2. Applications for license to marry shall be uniform throughout the State; and it is hereby made the duty of the State Department of Health to furnish a form therefor to the several clerks at once upon the approval of this act; Provided, That said State Department of Health may revise said forms, so furnished, from time to time, as may be advisable.

Section 3. No license to marry shall be issued where either of the contracting parties is an imbecile, epileptic, of unsound mind, or under guardianship as a person of unsound mind; nor to any male person who is or has been, within five years, an inmate of any county asylum or home for indigent persons, unless it satisfactorily appears that the cause of such condition has been removed, and that such male applicant is physically able to support a family; or if, at the time of making application, either of the contracting parties is under the influence of an intoxicating liquor or narcotic drug; and no license shall be valid for a longer period than sixty days from the date of issue.

Section 4. In those cases, when the right to a license is not made to appear, the clerk shall refuse to issue the same. At once, upon such refusal, he shall certify the proceeding to the proper orphans' court, without formality or expense to the applicants, who shall be notified by him of such action. Such application shall thereupon be, at the earliest practicable time, heard by the judge of said court, without a jury, in court or in chambers, during the term or in vacation, as the case may be; and his finding that a license ought to issue or ought not to issue shall be final, and the clerk shall act in accordance therewith; the true intent of this section being to secure for the applicants a hearing by said judge, without affirmative action by said applicants, and to give notice to them of such hearing, its time and place, without delay or expense.

Section 5. All Acts or parts of Acts conflicting with the provisions of this Act be and the same are hereby repealed: Provided, That nothing in this Act shall be construed to authorize the marriage of persons not of legal age, without the consent of parents or guardians, as now provided by law.

Approved—The 24th day of July, A. D. 1913.

JOHN K. TENER.

In line with the comprehensive laws for the protection of the lives and health of the people, which have placed the Commonwealth of Pennsylvania in the front ranks in Public Health work, our legislators during the recent session have enacted and the Governor has approved a marriage law while not perhaps all that could be desired, is at least a step in the right direction.

Originally the sacrament of marriage was recognized only as a religious ceremony and was entirely under the control of the Ecclesiastical authorities, but gradually, during the last several hundred years, it has through the developmentof statutory law, been recognized as the joint concern of Church and State, not only a moral and religious obligation, but also a civil contract, involving the peace and dignity of the community.

The higher courts of the several states have frequently decided that the interests of the state are involved in every marriage and that the state is a third party in every such contract.

The property and stability of any nation, and especially one under a representative form of government, depend upon the home conditions which surround its individual citizens. The contract of marriage contemplates the establishing of a new home and the rearing of a new generation, which in turn must be fitted for the same responsibilities.

For centuries men have exercised care in raising crops and domestic animals and have neglected the application of like principles to the reproduction of the human race, except when barbarous or semi-barbarous nations, prompted only by the necessity of better defending themselves from their enemies, have propagated generations of physigiants for their armies.

The new law aims to secure to the offspring of the marriage for which a license is sought, their proper heritage of health, sound mind and competent parentage; its most important provisions are:

First. That no Marriage License shall be issued if either of the applicants is afflicted with a transmissible disease.

Second. That no license to marry shall be issued if either of the applicants is an imbecile or of unsound mind.

Third. That no license to marry shall be issued if either of the applicants is an epileptic.

Fourth. That no license to marry shall be issued if either of the parties is under the influence of an intoxicating liquor or narcotic drug.

Fifth. That no license to marry shall be valid for longer than sixty days after issue.

Sixth. That no license to marry shall be issued if the male has at any time within five years been an inmate of any asylum or home for indigent persons unless it be satisfactorily shown that the cause of such condition has been removed and that he is at the time of making application physically able to support a family.

Seventh. That a written and verified application must be made to the clerk of the Orphans' Court, the form of which must be prepared by the State Department of Health.

TRANSMISSIBLE DISEASES.

While the law provides that neither of the applicants shall at the time of making application be suffering with a transmissible disease, it does not attempt to define or enumerate such diseases. The Act of May 14, 1909, P. L. 955, designates certain diseases as communicable or transmissible and under existing laws the Department of Health may add to this list. The following diseases are now reportable in Pennsylvania as communicable or transmissible, to wit: Actinomycosis, anterior poliomyelitis, anthrax, bubonic plague, cerebrospinal meningitis, chicken-pox, cholera, diphtheria, epidemic dysentery, erysipelas, German measles, glanders, leprosy, malarial fever, measles, mumps, pellagra, pneumonia (true), puerperal fever, rabies, relapsing fever, scarlet fever, smallpox, tetanus, trachoma, trichiniasis, tuberculosis, typhoid fever, typhus fever, uncinariasis, whooping-cough, yellow fever. To this list should be added sexual diseases, such as gonorrhoea and syphilis, which are clearly and perhaps particularly within the provisions of the act.

Some of the above enumerated diseases are so rare as to be of little importance in the application of the law. Other well known diseases, such as scarlet fever, diphtheria, measles, etc., are usually but of few weeks duration, would only necessitate a brief postponement of the contemplated marriage and in such case the law imposes no hardship upon the prospective brides and grooms but only a reasonable precaution. The presence of a sexual disease in either of the parties contemplating marriage, if such marriage is consummated, invariably brings distressing and disastrous results often disclosed in the divorce courts, infects innocent women with a dreadful disease, and the progeny of such unions, if any, are likely to be born the helpless victims of a parental indiscretion. It is contrary to public morals and against the public welfare, and these should always be guides to our law makers, that such marriages should ever be solemnized.

Among the common transmissible diseases, tuberculosis stands alone as not coming within either of the above mentioned classes. This dreadful and all too prevalent affliction is not of short duration and it is true that in many instances the law will permanently prevent marriage of sufferers who have passed the incipient stage of the disease. For incipient cases modern methods of treatment and right living now offer relief and though it may take months until the victim is free from the evidences of active disease, with these the disability need not be permanent.

For those who have reached an advanced stage of the disease, and are incurable, marriage, with its intimate relationships and vital responsibilities is against human economy. Though tuberculosis is not hereditary, it is highly transmissible. Who is more poorly fitted to become the head of a family than one whose system is wrecked by the germs of tuberculosis and who unless constant and diligent care is exercised, is a menace to loved ones to whom he should be a protector and whose few remaining years of life suggest a helpless widow and dependent orphans?

IMBECILES AND INSANE PERSONS.

An imbecile is a person of undeveloped or impaired mind. This affliction is usually congenital, dating from birth, in which case the subject though living to years of manhood or womanhood, remains mentally a child or an infant. In some cases imbecility may occur with old age or as a result of some disease which has impaired the mental faculties. For many years the laws of our State have prohibited the marriage of persons under the age of 21 years without the consent of parent or guardian, the manifest reason for this prohibition being the solemnity and the great importance of the marriage contract to those entering into such relation, in the eyes of the law requiring the serious and sober judgment of a fully developed adult mind. It would be much more reasonable to permit persons of the age of 18, 16 or even less to marry at will than to permit the marriage of an imbecile. The law does not recognize or enforce any other contract or promise on the part of a person so badly afflicted.

Insanity is hereditary. By permitting insane persons to marry the peace and welfare of future generations are imperiled. A lunatic is not considered to be morally or legally responsible for his acts; in our criminal courts insanity is a proper defense to even the highest crime known to the law, and if the accused is found to have been of unsound mind at the time the deed was committed, no penalty is imposed. This provision is only a legislative expression of the common law as it has been since the Commonwealth was established.

The Commonwealth of Pennsylvania is spending about three and one-half millions of dollars annually for care and treatment of indigent feeble minded and of indigent or criminal insane. This great sum of money would furnish the necessities of life to a city of fifteen thousand persons. Public economy would dictate to our law makers that every effort should be made to reduce this drain on the State's resources, especially since such a reduction means so much more than can be expressed by money values in saving our future citizens from misery and distress

EPILEPSY.

Epilepsy is recognized by medical authorities as a chain of symptoms rather than a well defined disease, these symptoms indicating in many instances abnormal conditions of the blood or brain tissues would bring the epileptic within other prohibitions of the law relating to persons of unsound mind or those suffering with transmissible disease. Epilepsy is likely to develop imbecility or insanity and at best its victims are poorly fitted to care for a family. It is hereditary in a marked degree in that the progeny of epileptics while not necessarily sufferers from epilepsy itself, are usually weak and often paralytics, imbeciles or afflicted with hysteria. Féré following the lineage of 594 epileptics, found among their direct descendants, 76 suffering from epilepsy and 948 from other serious nervous disorders. If we owe to future generations good health and normal minds, they should be protected from such a heritage.

INTOXICATING LIQUORS AND NARCOTIC DRUGS.

The provision of the law forbidding the issuing of marriage licenses to persons under the influence of intoxicating liquors or narcotic drugs entails but a brief delay if parties making application would otherwise be entitled to a license.

The law, in other matters, holds persons responsible for acts committed while under the influence of liquor or drugs, our jails and penitentiaries are well populated with convicts who owe their downfall to drink or narcotics and who if they had not been under such influence would not have committed the deeds for which they are incarcerated. In like manner individuals, male or female might, while under the influence of intoxicants either of their own initiative or through undue influence be led into marriage relations which would afterward be deeply regretted and which, not having been prompted by proper motives, could only bring disastrous results. It is not likely that heretofore clerks to the Orphans' Courts have knowingly issued marriage licenses to persons under the influence of intoxicating liquors or narcotic drugs even though they did not have written law to sustain a refusal.

For more than fifty years (Act of May 8, 1854) our laws have made it a misdemeanor punishable by fine or imprisonment for a Justice of the Peace, alderman, clergyman or other person authorized by law to solemnize marriage, to perform the marriage ceremony while either of the contracting parties was intoxicated. This law was enacted thirty years before marriage licenses were required in Pennsylvania.

LICENSES VALID FOR SIXTY DAYS ONLY.

In order that the provisions of the law regarding transmissible diseases, epilepsy and insanity may be effective it is necessary that some limitation be placed upon the time during which the marriage license shall be valid. This time our legislators have fixed at sixty days. Prior to the passage of this law a marriage license, once issued, could be used at any time. In perhaps 99 cases out of every 100 the marriage ceremony was solemnized within a few days, much less than 60, while the hundredth case may have remained open for years, leaving incompleted records in the office of the marriage license clerk, interfering with returns to the State of accurate and valuable statistics.

The fees charged for marriage licenses are so small that if in isolated cases the ceremony for some good reason can not be performed within the limit designated by the law, it will be no great hardship upon the contracting parties to make a second application.

INDIGENT MALES.

It is important to the welfare of society and to the personal and property rights of individuals that persons entering into contracts should be able and competent to fulfill them. There are many laws on our statute books intended to protect innocent citizens from financial loss through representations of irresponsible persons. The contract of marriage carries with it on the part of the male, the most vital and important obligations, both to his consort and to society at large. It is his duty to furnish a home for his family, to provide for them the necessities of life, and to give to his children advantages which will fit them for good citizenship. As the civil contract of marriage is authorized, controlled and directed by the State, it is proper that the State should not permit such a ceremony in cases where it is manifest that the wife and children, if any, will be dependent upon their own labor, or upon public or private charity for their support.

WRITTEN AND VERIFIED APPLICATION.

The law provides that no marriage license shall be issued except upon written and verified application which application shall be uniform throughout the State. The form therefor is to be furnished to the clerks of the Orphans' Courts by the Department of Health. The evident purpose of this requirement is to inform the clerk who issues the license whether or not there is any legal impediment to the proposed marriage either on account of this law or any former law, and whether it may be necessary for him to make further inquiries and secure further information before the license can be legally issued. The following form has been prepared and distributed:

APPLICATION FOR MARRIAGE LICENSES.

No.........

COMMONWEALTH OF PENNSYLVANIA, }
COUNTY OF.............................. } ss.

We, the undersigned, in accordance with the statements hereinafter contained, the facts set forth wherein we and each of us do solemnly swear are true and correct to the best of our knowledge and belief, do hereby make application to the Clerk of the Orphans' Court of ....County, Pennsylvania, for a license to marry.

....

....

Statement of Male.

Full name and surname, ...

Relation of parties, if any, either by blood or marriage, ...

Color, ... Occupation, ...

Birthplace, ... Residence,..................

Age, ... yrs. Previous marriage or marriages, ...

Date of death or divorce of former wife or wives, ...

Is applicant afflicted with any transmissible disease? ....

Name and surname of Father, ... Of Mother............

.... Maiden name of Mother, ...

Residence of Father, ... Of Mother, ...

Color of Father, ... Of Mother, ...

Occupation of Father, ... Of Mother, ...

Birthplace of Father, ... Of Mother, ...

Is applicant an imbecile, epileptic, of unsound mind or under the influence of any intoxicating liquor or narcotic drug, ...

....

....

Has applicant within five years been an inmate of any county asylum or home for indigent persons, ... Is applicant physically able to support a family, ...

Signature of applicant, ...

Statement of Female.

Full name and surname, ...

Relation of parties, if any, either by blood or marriage, ...

Color, ... Occupation, ...

Birthplace, ... Residence, ...

Age ....yrs. Previous marriage or marriages, ...

Date of death or divorce of former husband or husbands, ...

Is applicant afflicted with any transmissible disease? ....

Name and surname of Father, ... Of Mother............

.... Maiden name of Mother, ...

Residence of Father, ... Of Mother, ...

Color of Father, ... Of Mother, ...

Occupation of Father, ... Of Mother, ...

Birthplace of Father, ... Of Mother, ...

Is applicant an imbecile, epileptic, of unsound mind or under guardianship as a person of unsound mind, or under the influence of any intoxicating liquor or narcotic drug, ...

Signature of applicant, ...

Sworn and subscribed before me this........day of........, A. D. 191.....

....

Official title, ...

My commission expires, ...

Official seal.

The law requires this application to be verified. This provision might admit of various interpretations. The term "verify" might be broad enough to authorize the requiring of a physician's certificate. A physician's certificate, however, would not be especially valuable unless, in the several counties, some reputable physician could be officially appointed as Medical Inspector, for which at present there is no legal authority. Therefore, this application is now verified by oath of each of the parties making application both as to the truth of his or her own statement and of the statement of the other applicant.

The questions as to name, color, occupation, birthplace, and residence, are the same as have been heretofore required and are for the purpose of full identification of the contracting parties.

Answers as to the relation of the parties will reveal to the clerk whether or not the laws of the State as to consanguinity or affinity would prevent the marriage of the applicants.

The age of the applicant should be given in years at his or her last birthday. This will indicate to the clerk whether or not the consent of the parent or guardian is necessary, which consent if necessary, must under existing laws be given in writing upon another form.

The questions as to former marriage or marriages and date of death or divorce of former consort if any, are in conformity with the former practice, and are for the purpose of indicating whether the applicant is at the time of making the application, free from any other marriage relation. The Act of March 27th, 1903, directs the clerk in cases where the applicant has been divorced to enter on the marriage license itself the cause for which the divorce was granted. Neither the new law nor any other Act of Assembly prohibits the remarriage of a person who has been divorced whatever the cause of divorce may have been. It is not a condition precedent to the granting of a license, and there is apparently no legal authority for requiring the applicants to state in their application under oath what the cause of the divorce may have been. This information should be secured by the clerk in the same manner as heretofore.

A negative answer to the question whether applicant is afflicted with any transmissible disease would evidently suffice unless the clerk or magistrate should have other evidence to the contrary.

The inquiries as to name, residence, color, occupation, birthplace, etc., of the father and mother are more in detail than has been heretofore required. The information contained in the present form is evidently intended to overlap from generation to generation. Through these legal records hereafter genalogy may be definitely traced and they will be very valuable in the settlement of estates and in the determination of other important legal questions.

Each statement contains the query "Is the applicant an imbecile, epileptic, of unsound mind, or under the influence of any intoxicating liquor or narcotic drug. In connection with this part of the statement the affidavit required by each applicant testifies not only that his or her statement is true and correct, but that to the best of his or her knowledge and belief the statement of the other party is also true and correct. The statement of an applicant that he or she is is not an imbecile or of unsound mind, or under the influence of liquor or drugs, might not be very valuable, but the other applicant should know better than any one else whether such statement is true and correct.

If the question whether the applicant has been an inmate of a county asylum or home for indigent persons is answered in the negative the question following is not material. If, however, the male applicant has been an inmate of such asylum or home, then the question "Is applicant physically able to support a family" becomes pertinent. If it is clear that he is to become self-supporting and has no physical ailments which would prevent him from earning a living for himself and family, the fact that he was once an inmate of a county home should not prevent the isuing of the license.

For the execution of this application it is not necessary that the parties should appear in person before the clerk of the Orphans' Court, the application can be sworn to before any official authorized by law to administer oaths.

In case of doubt as to whether or not the license should be issued the law provides that the clerk should refuse to issue the license and immediately certify the proceeding to the Judge of the Orphans' Court, who shall consider and decide the question without delay and without expense to the applicants. Before deciding any pertinent question as to the physical or mental condition of an applicant the Judge would undoubtedly be justified in requiring a medical examination or the testimony of a practising physician, if in his opinion such evidence was necessary. This provision will entitle all persons making application for marriage license, either to receive their license at once or to be given the benefit of a judicial hearing and decision, it being the very evident purpose of the law not to prevent or unnecessarily delay any marriage unless there is good and sufficient reason why the same should not be solemnized.

Although the Act contains the usual clause repealing former Acts, if any, that are not consistent with its provisions, it does not appear to affect our present marriage laws other than by adding the several new provisions before mentioned. Our former laws, not being inconsistent, are therefore not repealed.

It is a proverb of statesmanship that the law should follow public sentiment and not attempt to create it. The subject of Eugenic Marriage is not new to the public. It has been discussed in the public press and in leading periodicals, has been studied and commented upon by prominent scientists, jurists, genealogists and medical authorities and has been considered by legislators of other States. In Indiana a law containing all the provisions of this Act was adopted in 1905 and has since been successfully administered. In Delaware, by Act of April 10, 1911, no marriage license can be issued to persons under the influence of intoxicating liquor or narcotic drugs or to any person who is or has been an inmate of any insane asylum unless it satisfactorily appears that such person has been discharged from such asylum. In Minnesota the Act of April 18, 1911, provides that no marriage shall be contracted between persons either of whom is epileptic, imbecile, feeble minded or insane.

In other states, legislative commissions have been created for the purpose of preparing and submitting a Uniform Eugenic Marriage law, and it is probable that in many states of the Union laws similar in their provisions to the Indiana and Pennsylvania laws will in the near future be enacted.

P416h

PENNSYLVANIA
Health Bulletin

No. 50. HARRISBURG, PA. SEPTEMBER, 1913.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

HEALTH AND EDUCATION.

Address delivered before the Pennsylvania State Educational Association, Nineteenth Annual Convention of the Directors' Department, February 5th, 1914, at Harrisburg, Pa., and printed by consent as a substitute for other manuscript prepared for September, 1913, Bulletin.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 50. HARRISBURG, PA. September, 1913.

HEALTH AND EDUCATION.

Address delivered before the Pennsylvania State Educational Association, Nineteenth Annual Convention of the Directors' Department, Feb. 5th, 1914, at Harrisburg, Pa., and printed by consent as a substitute for other manuscript prepared for the September, 1913, Bulletin.

The responsibilities of those charged with the education and care of youth are appalling. It is in their power to shape our coming generation. The forester has learned to keep his saplings healthy while he is training their stems if he wishes to have a high grade of timber. No matter how good the seed may have been the trees will soon become stunted and gnarled unless they have a proper environment with its nourishing soil, sunlight and air. Unless nature's demand is satisfied the young tree takes on its tortuous shape and fails to develop and often interferes with others associated with it and they too become crooked and fail to reach that condition which usefulness demands for their final product. The various saplings should be given every opportunity to develop the strong characteristics with which nature has endowed them.

Our children may be compared with the sapling. They too must have the surroundings which nature demands. We cannot go far from nature in developing any kind of organic life. The child is like the tree in that it must be developed with a good balance. It will not do to try to develop one part of the body at the cost of another part. First we must develop the physical body as nature intended and lead the brain to grow only so fast as the physical body will permit. They must progress hand in hand. The tabernacle must be strongly constructed and duly made ready that the brain may be properly developed and maintained. It only lives as long as the body. They belong to the same pieces of machinery. This we all know as we know our ABC's but it is too often lost sight of by our school teachers.

While a member of the Board of Education in Philadelphia and Chairman of the Committee on Hygiene, I had it demonstrated to my satisfaction that we were not getting a full return for the money and energy we were expending because of the feeble bodies of many of our students. It was gratifying to observe that the combined intelligence of the teacher and the natural ability of the taught gave to the child a training of the gray matter that was attractive. The child was being armed with instruments which could be successfully used by reason of its unusual natural ability, but presently in many instances there came the dreadful awakening and we realized the fact that the physical body had failed to a helpless degree and the child had become a hopeless physical wreck either to meet an untimely death or live a life of suffering, and in some cases become a charge upon society.

A large factor in the development of tuberculosis among the children is the weakening of their general physical bodies, to such a degree that they lose their resistance. This is often due to driving them to overstudy and forcing them to sacrifice the outdoor life necessary for the growing child. Too often I see children who will never grow up, and who are being sacrificed to the vanity of their parents.

We are pleased to see children who have active brains and become brilliant students and stand high in their classes; and the fathers, and more often the mothers, are flattered at finding that their own children are outstripping those of their neighbors in their studies. I remember seeing a poor anemic little fellow in a physician's office where he had been brought by his father for some trifling surgical injury which indicated feeble nutrition. His countenance showed a high degree of intelligence, but he was pale and anemic in the extreme; his manner was nervous and his expression was one of weariness. I asked his father if the boy attended the public schools. "Oh, yes," he answered, "and stands at the head of all his classes." But can't you see, I said, that he is overcrowding his brain and his body is pining for fresh air? That boy ought to be taken from school at once and made to live in the open air until his health is thoroughly established. "Impossible!" exclaimed the father "it would break his mother's heart."

Now here was a most promising boy, and the idol of his mother's heart, and yet she was jeopardizing his health and life in order to gratify her maternal pride in his attainments. Her field of vision was too narrow.

The fact is that we Americans have been too much in the habit of regarding our children as solid lumps of intellect, and have forgotten that their nature is a two-fold one, that they have bodies as well as minds, and that if we would have them grow up to a perfect manhood and womanhood we must educate their dual nature and not one at the expense of the other. The most thoroughly and well balanced nation at present is the German. It is also the most robust, showing that it is possible to educate the brain and at the same time keep up a vigorous body. But this is true because from the very cradle the Germans begin the education of the body as well as the mind and the education is carried on symmetrically to maturity, the body receiving its full due all along. The farmer's children who attend school only six or seven months in the year and walk miles to school every day are better able to stand the cramming process on which the modern pedagogue insists than those who live between city walls. We are defying nature by following the habits of the cave dwellers.

Every day I see in the street cars young girls carrying veritable libraries of educational books and too often their pale cheeks testify that time has been devoted to mastering their contents, some of which might better have been given to open air games. If they would use half as many books and walk to school instead of riding in crowded cars, their chances of living to vigorous maturity and having a more profound education would be greatly improved.

Statistics show that during the middle period of school life a noticeable and rather sudden increase of tuberculosis takes place, and knowing what we do of the physical condition which predispose to the life of that germ in the human body, this is only what we should naturally expect.

Our school laws in this State contain many provisions for the protection of the health of our children, but these are far too often overlooked by the teachers and by those who arrange the overloaded curriculums.

One day a gentleman walked into my office and said in a sad voice "You hit me hard! You hit me hard!" It was a friend I had no reason to offend so you can imagine I was much surprised and inquired, "What do you mean?" He exclaimed, "I read your article in the Ledger too late." His son was a student at the University of Pennsylvania and had for some months been failing in health. He was ambitious, however, to pass his examinations and his parents sympathized with him and were also a bit ambitious, so they consulted the family physician which resulted in an agreement that he should keep up his work and as soon as he passed his examinations he should take a long sea voyage so that he might build up his health by the next term of school. The work was too hard on his physical strength and he had just died when the father picked up the newspaper and read an article of mine on the necessity of keeping up the physical strength to sustain mental strain. I shall never forget his sad words—"You hit me hard." It was too late—the only son had been educated to death.

Not only is much of our educational effort badly co-ordinated with our physical needs, but no small part of our so-called education is of little value even as a mental training for the work of life. If we leave to one side the requirements of strictly professional training it is not difficult to maintain the thesis that there is too much and too varied instruction not merely in our colleges but also far down in our lower schools. One who watches the ebb and flow of modern social movements cannot fail to be struck with the widespread—often hysterical—demand for more instruction along lines of peculiar delicacy and difficulty and touching subjects of which indeed "a little knowledge is a dangerous thing"—and this quite unmindful of the important truth that no such increase of knowledge is of the slightest value unless there goes with it some training of a sense of responsibility.

There should be a time in school life when the dangers of sexual disease should be pointed out. This should not be left to the public theatres where there is a mixed audience, which often attracts those with morbid minds.

Let us make no mistake here—we may pass all the laws we please—or may have a Commission or any other form of government, but we shall not better things unless we lift the moral tone of our people.

We should, therefore, require the highest models of morality for our instructors of youth, for they learn much from example. Education in the possession of the immoral is an instrument in the hands of the devil and often works great harm, therefore, we must require a high degree of morality if we wish our representative form of government to reach its highest efficiency. The future success of our form of government depends upon the goodness and self control of our people and those growing up under our present school teachers will likely settle the question. In the days of Franklin when our government was created the people were as one family whose blood had been shed for its country and freedom. It has been handed to us to maintain with the difficulties of a cosmopolitan population a large part of which is transient and much of which fails to appreciate how much that government has cost and how much it is worth. We fail to recognize that it is a government of the people and therefore that it is each man's duty to take an active part in governmental affairs. Many of our voters do not understand our constitution and the laws which have been passed to maintain our civil liberty.

One thing that should be taught our children is their political responsibilities. Another thing youth should be taught is the truth that the battle of life is not to be fought single-handed. Co-operation with our fellow beings is essential for the success for all human undertakings. The individual must be taught that he does not live for himself alone, but that many of his every day duties must be beneficial to his neighbor, and possibly greater than all, he must lead a life which is both honest and human, otherwise his learning and his labors fall for nothing.

Life must not be looked upon as a war with our fellowmen—we must realize the necessity of being and must actually be our brothers' keepers. Individuals must take care of individuals, municipalities must work in the interest of each other, and between these great United States of America there must be an unselfish bond of love and patriotism which the folly and selfishness of man cannot destroy. To bring about this condition the student must not only be taught the theory of working in harness, but must be trained in school life to practice co-operation with his fellow students, so that it shall become to him second nature.

Up to recently our virgin soil, mines of valuable metals and combustibles have intoxicated us with wealth. It is only of late that we have awakened to the fact that we have been living off our principal. The day is upon us when we must conserve. We must produce more from our soil and we must be more economical, therefore, economy must be taught in our schools.

We must educate housewives who will know what food-stuffs are necessary to satisfy the growing bodies of their children and we must teach them how to select the cheaper foods and also how to cook them so as not to destroy their valuable constituent parts necessary for the physical body, and to render them more digestible Today the French peasant will live on what we throw away.

Our educators should study all the fields of labor both physical and mental which are necessary to civilized life and make up curriculums so that they may all be satisfied. We should not formulate a series of studies with the idea that all our children are going to pursue them to the end. The students are endowed with brains of various capacities, naturally limited to serve in certain fields of life. A continuous line of studies leading from the kindergarten through the High School is apt to be defective because it does not permit scholars to break off at enough points where their natural abilities call upon them to switch off to pursue the kind of work nature has endowed them to do. The curriculums should be in blocks, as it were, so that each will round the students up for some field our political economy demands and in harmony with their natural ability.

In our tuberculosis work we find mothers who have graduated at the high schools and they are trying to rear their little children on molasses and white bread, and wonder why their offspring are stunted and emaciated. They don't know how to cook or how to sew. They should be taught how to live and how to live economically. Their knowledge of their native language, arithmetic, history and writing does not prepare them to run their houses and raise their children or feed themselves and their husbands. They should be taught economy in its broadest sense.

Children should be taught the value of foodstuffs, fresh air, cleanliness and physical exercise.

This brings us up to the Pennsylvania School Code and the medical inspection of school children in the Fourth Class districts. The Code gives the school directors the right to vote whether or not the inspections are to be made. The result of this was that in the year 1911 we only had the responsibility of inspecting 785 districts, whereas, this year the number has become 1831. The uncertainty makes it impossible for the Commissioner of Health to calculate how much money to ask for to conduct this in some respects, perhaps as important as any work done by the State, during the two years following the next session of the General Assembly.

In 1901 when I was Chairman of the Committee on Hygiene of the Board of Education of Philadelphia, the first medical school work was done, which resulted in such phenomenal improvement in the so-called backward children that a liberal appropriation was obtained and a compulsory examination made possible, with a result which only the teachers, parents and children fully appreciate. The comparatively blind have been made to see, the deaf have been made to hear, the sleepless have been given sleep, and the backward scholars are now shoulder to shoulder with those they looked upon as being some sort of superior beings.

When God permitted man to invent the wireless method of communicating at long distances and thereby to save thousands of lives from the perils of the sea, it was immediately accepted by all the people of the civilized world as one of the greatest blessings of the age. Why should the same people object to making the practical application of scientific medical discoveries to our school children that they may hear and see all those things which make them happier and more useful members of society, yes in many cases save their lives.

We having been permitted to discover how to make the deaf hear, the blind to see, why is it not a sin for those entrusted with the care of the people to refuse these afflicted little children relief?

This grand work that fills the hearts of those engaged in it must be encouraged by all those interested in little children and in the rising generation. The medical school inspections not only give the helpless the power of helping themselves and their fellows; they cut down the communicable diseases that our schools have heretofore disseminated as shown by statistics. When properly conducted they make the helpless helpers and prevent sickness and death. They save the lives of our young American born citizens—those who mean to live and die citizens of these great United States of North America. When the result of our pioneer work is known and understood we need no longer fear a vote not to have medical school inspections.

In a representative form of government you cannot go far ahead of the average intelligence of the people and as soon as I saw the want of appreciation of the necessity of the work it was clear that opposition would discount its efficiency. The results, however, even under the adverse circumstances, are more than gratifying. The parents who have been informed of the defects of their children have sought medical treatment which has resulted in improvement of the health of the children, and which of necessity means that their generation will become a stronger people better able to meet the ever increasing struggle for existence. It will cut down illness from communicable diseases and therefore the death rate. The expenditure of money and energy in our schools will be better rewarded. It will increase the happiness of the school room and the home. When you have the eyesight, hearing, breathing, the health of the teeth and skin improved, the abnormal growths removed, the communicable diseases cured, the health built up, you will have improved the soil upon which you are sowing the seed of education that it may germinate and the trees therefore bring forth good fruit. The success of the individual and the strength of our nation depend primarily upon the health of our people. To obtain this end health measures must be enforced throughout childhood. With my experience with medical inspection in Philadelphia years ago I longed to introduce it everywhere in the Commonwealth, and in 1910 the Attorney and Auditor Generals agreed with me that the General Assembly had in its wisdom made the form of the appropriation to the Health Department broad enough to meet the emergencies of all health work.—This enabled us to introduce medical inspection of schools in a few districts in the central part of the State, resulting in trying out the work in 657 rural schools, including 14,434 pupils. This experiment gave us an idea of the good which could be accomplished, the cost of the same, and prepared us to test out methods of organization, therefore, when we took up the work in the 1911-1912 session and again in the 1912-1913 session, our preparatory work enabled us to get the result shown in the table for the latter year.

SCHOOL MEDICAL INSPECTION—Fourth Class Districts session 1912—1913.

No. schools inspected,	7,375	
No. school rooms inspected,	11,684	
No. pupils inspected,	305,372	
No. pupils defective,	228,693	74.89%
No. pupils not defective,	76,679	25.11%
No. having single defects recorded,	91,408	
No. having multiple defects recorded,	187,285	
Total number of defects recorded,	599,272	
No. letters forwarded parents concerning defects,	210,001	

EYES.

Pupils having defective vision,		82,454	27.0%
No. having defective vision right eye,	12,190		
No. having defective vision left eye,	13,515		
No. having defective vision both eyes,	56,749		18.5%
No. having corneal defects,		2,293	
No. having corneal defects right eye,	658		
No. having corneal defects left eye,	825		
No. having corneal defects both eyes,	810		
No. having blepharitis,		1,183	
No. having conjunctivitis simplex,		1,009	
No. having conjunctivitis follicularis,		22	
No. having iritis,		27	
No. having trachoma,		18	

HEARING.

No. pupils having defective hearing,		8,818	2.9%
No. pupils having defective hearing right ear,	3,487		
No. pupils having defective hearing left ear,	2,970		
No. pupils having defective hearing both ears,	2,361		
No. pupils having otorrhoea,		3,724	
No. pupils having R. otorrhoea,	858		
No. pupils having L. otorrhoea,	943		
No. pupils having otorrhoea both sides,	1,923		

BREATHING.

No. pupils having defective breathing,		10,579	3.4%
No. having slight impairment,	6,845		
No. having serious impairment,	2,117		
No. having mouth breathing,	1,617		
No. having adenoids, (suspected),		4,454	

TEETH.

No. having defective teeth,		119,246	39.05%
No. having unclean teeth,	27,685		9.06%
No. having decayed teeth,	91,561		29.98%
No. having gums diseased,	928		

TONSILS.

No. having enlarged tonsils,		87,202	28.5%
No. having slightly enlarged tonsils,	60,846		19.9%
No. having greatly enlarged tonsils,	26,356		8.6%
No. having acutely inflamed tonsils,		1,126	
No. having enlarged cervical glands,		19,650	6.4%

TUBERCULOSIS.

No. reported as having tuberculosis,		635
No. reported as having tuberculosis—Lungs,	192	
No. reported as having tuberculosis—Glands,	367	
No. reported as having tuberculosis—Bones,	33	
No. reported as having tuberculosis—Joints,	43	

NERVOUS DISEASES.

Chorea,	291
Epilepsy,	82

SKIN DISEASE.

No. having skin affections,		4,081
Scabies,	88	
Impetigo contagiosa,	260	
Favus,	1	
Ring Worm,	58	
Nits in hair,	3,657	
Head lice,	11	
Body lice,	6	

DEFORMITIES.

No. pupils having deformities,		1,529
Hunch back,	40	
Club foot,	50	
Curved spine,	59	
Ankylosed joint,	13	
Hair lip,	29	
Cleft palate,	95	
Goitre,	347	
Miscellaneous,	896	

NUTRITION.

No. pupils noted subnormal in nutrition,		13,618
No. pupils noted fair in nutrition,	11,463	
No. pupils noted poor in nutrition,	2,155	

QUARANTINABLE DISEASE.

No. pupils in school that should have been in quarantine,		57
Chickenpox,	27	
Whooping-cough,	24	
Measles,	5	
Diphtheria,	1	

In compliance with a note attached to the duplicate report forwarded to each teacher concerning defective pupils, return reports were made to the Department at the end of the session. The following table entitled—Teacher's Follow-up Work" session 1912-1913, shows how splendidly these school officials have co-operated for the promotion of good end results.

TEACHER'S FOLLOW-UP WORK—SESSION 1912-1913.

Total No. of letters sent parents through teachers,	210,001
Total No. of teachers sending in replies at end of term,	7,375
Total No. of pupils covered by teachers' replies,	132,462
Total No. of pupils reported treated,	30,099
Total No. of pupils reported improved,	29,245
Total No. of defects reported improved,	38,574
Total No. of pupils not treated,	87,220
Total No. of records containing no report,	15,143

REPORTS CONCERNING DEFECTS.

	Improved.	Not Improved.
Eyes,	7,023	2,405
Hearing,	1,052	480
Breathing,	1,470	784
Teeth,	21,638	1,778
Tonsils,	5,038	3,173
Enlarged cervical glands,	479	248

TUBERCULOSIS.

Lungs,	12	3
Bones,	1	1
Glands,	3	0
Joints,	7	0

NERVOUS DISEASES.

	Improved.	Not Improved.
Chorea,	79	31
Skin diseases,	206	32
Head lice,	1,181	47
Nutrition,	345	137
Miscellaneous defects,	38	12

Died—85.

It will be interesting and surprising to those who have not followed up the results of medical school inspections being made in all parts of the civilized world to learn that almost 75 per cent. of the children examined in the rural districts by our Department had to be classed as defectives, and 27 per cent. of all the pupils had defective eyesight. By the end of the year over seven thousand of these children had their eyes treated with beneficial results. Defective hearing was found in 2.9 per cent., and at the end of the year one thousand of these had been successfully treated. A really more marked result was that obtained regarding poor breathing, as this condition in the majority of cases was caused by pathological growths in the nose which necessitated surgical operations, and yet nearly 1,500 of these children had their defects remedied. Twenty-two thousand had their teeth made clean and the decay removed.

The results just given are from our second attempt to make rural medical inspection. The work was handicapped by the teaching of those who certainly had not appreciated what it meant to our children and the present and future of our people.

The fact that the third year gives us 1831 districts, instead of 1,500 the previous one, demonstrates that the parents better appreciate what it means for their children. With the increasing intelligence the work will not only become more comprehensive but more thorough. The highest degree of efficiency, however, can only be obtained through the earnest co-operation of the School Directors. We must have but one high goal before us and that is the ultimate good of the children which means the happiness and strength of mankind.

P416h

PENNSYLVANIA

Health Bulletin

No. 51. HARRISBURG, PA. OCTOBER, 1913

Entered as second-class matter, August 9, 1909, at the Post-office at Harrisburg, Pa., under the Act of July 16, 1894.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

RELATION OF PUBLIC HEALTH TO INDUSTRIAL WELFARE

An Address before the Welfare Efficiency Conference held at Harrisburg, October, 1913.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 51. HARRISBURG, PA. OCTOBER, 1913.

RELATION OF PUBLIC HEALTH TO INDUSTRIAL WELFARE.

An Address before the Welfare and Efficiency Conference held at Harrisburg October, 1913.

Mr. Chairman and Members of the Conference:

The relation of the public health to industrial welfare and economic production is precisely the same as the relation of individual health to personal efficiency. As individual indiscretions and failure to follow a rational and temperate plan of existence are responsible for many personal ailments, so certain unhealthy social and economic conditions which have sprung up through the rapid development of the nation are responsible for a great proportion of the disease which we have to combat.

The growth of the great industrial centres, which has only been made possible within a comparatively brief period by the development of transportation facilities, has brought the majority of our population together and has produced new conditions and complications which menace individual welfare.

A large proportion of death and illness among our people is due to certain diseases which are preventable. To reduce their inroads upon the general health means the lengthening of the average span of life and a corresponding increase in the productive value of the individual. So upon these preventable and communicable diseases the State Department of Health has concentrated its energies. There are hundreds of ways in which communicable disease can be spread today that were impossible a decade or so ago. We have reached a stage of development in which no community can exist unsupported by others. In this age the specialization of industrial and agricultural pursuits and the rapid transportation of the growing variety of products make every community necessary to every other and the centres of population dependent upon the rural districts or vice versa. So that in the handling of communicable disease it has been necessary to devise means to meet this strictly modern condition that production and commerce may continue uninterrupted. Primitive methods of shot gun quarantine are impossible to-day.

It is inevitable that the State must perform a vast share of the work and must be in a position to control the situation in any or all parts of the Commonwealth as conditions demand. This necessity has developed an organization in the State Department of Health which reaches every portion of the Commonwealth and which is constantly alert to stamp out communicable disease in its incipency.

The widow Murphy's cow was responsible for one of the greatest and most costly conflagrations in the history of this country and likewise an uncontrolled flare up of small pox or typhoid in a remote community might readily result in an epidemic which would cost hundreds of thousands of dollars to the business men and manufacturers of the Commonwealth. The financial aspect of disease is one which it is well for this Convention to seriously consider. That which becomes an economic burden upon the individual must be shared eventually by every member of the community according to his means. If disease reduces the number of efficient workers, the cost of labor must increase, and if those dependent upon the bread winners be stricken, the financial burden resulting causes the increased demand upon the earnings and in turn upon the source of the individual income.

Let us take typhoid fever as an example of the financial loss which may result from a single disease. In 1906 there were 4,000 deaths from this disease in Pennsylvania and some 40,000 cases of illness from the same cause. Calculated at the lowest figures at which the economic value of human life can be set and the cost of treatment and the loss of wages incidental to illness, in this one year the loss was $24,000,000 and the disease was no more prevalent than usual. These figures by no means tell the whole story for they fail to take cognizance of the impairment of vitality or function which frequently accompanies an apparent recovery from typhoid fever. Such a condition may continue indefinitely and often means a lessened resistance to the inroad of other diseases. Typhoid fever is a preventable disease. For fifty years prior to the organization of this Department it had ravaged the State unchecked. One of the most important problems which the Department of Health had to face was the reduction of this enormous yearly tax levied by typhoid fever upon the people of the Commonwealth. The growing communities throughout the State had come to look upon the nearest adjacent waterway as the natural outlet for all sewage and without let or hindrance millions of gallons of pollution flowed into the streams. The indifference which any one municipality showed to the fact that this polluted water must eventually be used by some other municipality further down stream was only matched by the indifference of other communities yet further up stream which calmly proceeded to pollute its supplies. The cleansing of the Augean stables was but a trifle to the gigantic task of purifying the waterways through 45,000 square miles of territory.

Eight years is but a brief time in which to accomplish even a portion of such a task, and yet through the installation of filter plant and sewage disposal works, through the abatement of tens of thousands of individual sources of pollution upon water sheds, by educating the public and the communities, in eight years typhoid fever has been reduced seventy per cent. in Pennsylvania. In other words against 4,000 deaths in 1906 in 1912 there were but 1,300 and against 40,000 cases of illness from this disease but 13,000 and a resulting economic saving of $17,800,000 annually.

Consider further that typhoid, although one of the most unnecessary is by no means the most costly of communicable diseases. Professor Irving Fisher in his report prepared for the National Conservation Commission, discussed the financial aspects of the prevalence of tuberculosis and estimated "the gross loss of earnings by illness and potential earnings cut off by death together with the expenses of illness, etc., to amount to $1,000,000,000 per annum in the United States." Pennsylvania has approximately one-twelfth of the population, and according to these carefully prepared figures, bears a loss of $83,000,000 each year from this single disease. Tuberculosis is responsible for one-tenth of all the deaths in this Commonwealth and throughout the civilized world as well. Its roots reach deep into the social and economic structure. Bad housing conditions, poor sanitation, overwork and insufficient nourishment cause and foster it. Broadly speaking, it is a disease of poverty. It is an insidious disease of long duration which originates in the breaking down of the natural resistance of the individuual. As the disease advances this resistance becomes less and less and consequently the earning capacity of the sufferer is decreased so that many who have been fairly well-equipped to meet the economic problems of existence are reduced to poverty. Realizing that this is a general condition, the State has made provision for the indigent sufferers from this disease and through this Department offers to every man, woman or child suffering from tuberculosis and without means the best of care and treatment absolutely without cost.

In order to bring this free treatment within the reach of all, this Department has established 114 tuberculosis dispensaries throughout the Commonwealth where there are some 10,000 cases continually under treatment. Free medical advise is given and the patients are visited in their homes by the Department nurses who instruct them in proper methods of living to insure the greatest benefit to the patients and to prevent the infection of those with whom they come in contact. In addition to the dispensaries there are two great Sanatoria now open and a third nearing completion. The combined capacity of these three institutions will be 2,000 beds. The Mont Alto Sanatorium, with its capacity of 1,058 patients, is the largest institution for the treatment of tuberculosis in the world. At this Sanatorium 10,281 patients have been treated since it was opened in 1907.

The problems of tuberculosis, typhoid, small pox, etc., are too great and far reaching for any lesser agency than the State to deal with. While the co-operation of all interested is necessary, the State must lead, direct, and assume the chief burden of these menaces to its citizens. It would be as irrational to throw the burden of national defense in time of war upon a few straggling bands of patriots as to expect permanent results in these affairs from scattered workers, no matter how earnest. This is the broad point of view which our legislators have taken of the problem of protecting the public health.

The present population of the State is 8,000,000. Of these 2,500,000 reside outside of incorporated cities and boroughs. The placarding, establishment of quarantine, disinfection, etc., for this rural and semi-suburban population of 2,500,000 is entirely in charge of the Department of Health.

The State has been divided into some 700 districts, each in charge of a health officer. Every county has its county medical inspector who supervises the work of the health officers of the districts in his county. The county medical inspectors diagnose doubtful cases, investigate epidemics and visit suspicious cases where there is no physician in attendance. The work of these rural health officers is of great importance in protecting the health of the city dwellers, for the continual traffic in food supplies between the country and city offers a ready means for the conveyance of disease from rural to urban communities. Hence it is the duty of these officers, immediately upon receiving the report of the disease to visit the house, establish quarantine and take all necessary steps to prohibit its further spread through any such agencies.

Cities, towns and boroughs are required by law to maintain their own boards of health and administer the laws relating to health within their respective limits. When they are unable to do this satisfactorily, it is the duty of the Commissioner of Health to step in and take charge.

Thus when epidemics have occurred during the past eight years in Scranton, Reading, Wilkes-Barre, Erie, Coatesville, Troy, Carbondale and many smaller places, the Department of Health has assumed control. At the present time the Department has been called upon by the authorities in Philadelphia for conference and advice regarding the prevalence of typhoid fever, and the engineering division is making extensive investigations in and around that city for the improvement of existing conditions. There are numerous other branches of work which are correlated with those mentioned which can only receive brief mention at this time and yet all have a large share in the work in preventive medicine in which the Department of Health is engaged.

For example 667 stations are maintained throughout the State where free diphtheria antitoxin is distributed to the indigent. Without this great specific the death rate from diphtheria is forty-two per cent.; in the 52,300 cases which have been treated for cure with antitoxin supplied by the Department the death rate has been but a little more than eight per cent. Since the establishment of these stations 41,000 persons who have been exposed to diphtheria have been successfully immunized thus preventing further spread of the disease.

The Department Laboratories, in addition to the vast amount of work which they do for the tuberculosis dispensaries in the examination of specimens and the manufacture of tuberculin, and for other divisions of the Department in testing each year thousands of samples of drinking water suspected of contamination, make free laboratory examinations for all doctors who reside outside the few cities which maintain their own laboratories. This puts the physician in the smaller cities and rural districts on a more equal footing with the city practitioner and permits him to avail himself and give his patients the advantage of laboratory diagnosis in doubtful cases. In typhoid fever for example this often leads to the correct and speedy classification of a case which if it remained undiagnosed might become a source of infection to many others.

The Department is charged by law with the medical inspection of schools in districts of the fourth class which involves the inspection of 400,000 children yearly and requires a force of some 900 physicians during a portion of each year.

The Bureau of Vital Statistics of the Department is charged with the enormous task of keeping the records of 8,000,000 persons. Vital and morbidity statistics are the gauge which the public health officer must continually watch. They show the danger marks and point out the weak spots towards which the work of prevention must be directed. Last year (1912), in round numbers, 204,000 living babies were born in Pennsylvania and 112,000 persons died. There were 65,000 marriages. So perfect is the system with which these records are kept, giving the name and year in which the birth, death, or marriage took place within the boundaries of Pennsylvania, that the record can be obtained within two minutes' time after a request is presented. The morbidity reports are received and tabulated daily in order that an accurate watch may be kept upon communicable disease throughout the entire State. Whenever these records indicate that any disease is unduly prevalent, the proper preventive measures are taken by the Medical Division.

Another of the important activities of the Department has been the education of the general public in matters pertaining to sanitation and general health. By lectures, traveling exhibits, publications, and through talks in the newspapers, a constant effort has been maintained to keep the public thoroughly informed regarding matters relating to the public health.

When individuals and communities are brought to full realization of the fact that disease is not a mysterious visitation without tangible cause but the result of sanitary indiscretions or the failure to observe certain readily definable precautions, a tremendous step forward will have been accomplished. The value of preventive medicine is a comparatively recent discovery and the great majority of persons are still ignorant of its practical workings and the enormous financial benefits which it brings. The fact that many of our larger corporations, particularly those having large shops or factories where many persons work, have begun to realize the value of the trained sanitarian and take cognizance of the fact that the advice of the physician relative to the welfare of their employees results in financial benefit both to the employer and the employee is a healthy sign of the forward march and a general betterment of conditions.

The fact that this convention is here assembled to consider welfare and efficiency is a most encouraging sign to the public health worker. It strengthens the belief that you are all interested and will be willing to bring your influence to bear in the various communities from which you come to strengthen the hands of those who are charged with the administration of the public health. That you will counsel adequate provision that public health measures may be taken in these various communities. There is no more valuable conservation than the conservation of public health and there is no greater economy for a State or Nation than the active furtherance of all agencies productive of its preservation and improvement.

PA166

STANFORD UNIVERSITY LIBRARY
JUN 1 1914

PENNSYLVANIA
Health Bulletin

No. 52. HARRISBURG, PA. NOVEMBER, 1913.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

BATHING

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

PENNSYLVANIA

Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 52. HARRISBURG, PA. NOVEMBER, 1913.

BATHING

A bath may be the immersion of either the entire body of a person or of a part only in a fluid, a semi-fluid, or a gaseous medium. When speaking of a bath we imply a complete immersion of the person with the exception of the head. Partial immersions are generally designated by their special names, for example, the foot bath, the hip bath, the sitz bath, &c.

When no medium is mentioned water is always understood, otherwise the particular medium intended is usually specially mentioned. The primary action of the bath is upon the cutaneous surfaces. The first is the action of heat and cold, while the second is upon the flow of blood and lymph in the vessels, and upon the internal temperature. The first purpose of the bath is simply that of an abstersion and cleanliness, to remove any foreign impurity from the surface, and to prevent the pores from being clogged up by their own secretions or by the desquamation of the cuticle. This purpose is greatly facilitated by the use of the alkali of soaps and lukewarm water, followed by a thorough rinsing.

The science of baths may be considered from several points of view—for instance, the hygienic, the hydrotherapeutic, and the pharmacodynamic. The first two may be considered together after what has already been said in regard to the first purpose, that of abstersion and cleanliness. This purpose is strictly hygienic, while the action of heat and cold upon the body includes the hygienic and the hydrotherapeutic applications. The next action of the bath is upon the body temperature, closely connected with the effect upon circulation and respiration and upon the nervous system. The average man can remain in a bath, the water standing at a temperature of from 93° to 95° Fahrenheit, for fifteen to twenty-five minutes without experiencing any change in body temperature, provided the body is continuously and entirely immersed, otherwise the evaporation that takes place during the exposure of any one or different parts of the person causes a reduction of the thermal height. The presence of either salts or gases has apparently no effect in this regard. There is, however, a slight change in the thermal condition immediately after such an indifferent bath from evaporation caused by the unavoidable exposure of the body to the air. If you cause a vigorous withdrawal of the peripheral heat by immersing the person in a bath at a temperature of 77° to 86° F., a slight rise of temperature will be found in the axilla, while a bath in water standing at a temperature of 48° to 52° F., usually gives a rapid decrease of internal heat. This same result will be brought about by a long continued indifferent bath. Moderate baths are usually followed by fluctuations, chiefly vasomotor. Local cool baths are usually followed by slight rise of internal temperature.

A *cold* bath will always cause a great loss of heat in a healthy man, the loss being in proportion to the variation of the temperature of the bath from the point of thermal indifference. Thus in a bath at 93° F., the loss is the usual daily loss; at 86° F., it is twice as great; at 77° F., it is three times, and at 68° F., five times the ordinary daily loss.

When considering these facts as I give them you, it must be remembered that there is a distinction between *loss* of heat and *reduction* of temperature.

In a cold bath the production of heat is in proportion to its loss, therefore much depends upon the quantity of tissue one has to spare, as to the time he can endure the cold. From what has been said it is evident that the prevention of heat dissipation in the bath means an increase in body temperature.

We now come to a few facts in regard to the effect of baths on tissue change and excretion.

The cold bath and its allies, as the sitz, sponge, air baths, &c., &c., increase the production and excretion of carbon dioxide. This increase is proportionate to the production and loss of heat and is accompanied by an increased consumption of oxygen. An excessively cold bath or a too much prolonged cold bath will check this tissue change as soon as internal temperature begins to sink. This is due chiefly to fat combustion, resulting from a stimulation of the peripheral sensory nerves. Such stimulation may be obtained by bathing in water heavily charged with salt or gas, particularly where there is a sensitive skin, but not in the salt baths as usually found. Some experiments on rabbits showed 25% more carbon dioxide in the sea salt bath over and above what was found in simple water baths, the temperature of the respective waters having been the same in each case. As a rule albuminous tissue—muscular—change is not affected by what we have seen fit to term an indifferent bath or by a cold one unless the internal temperature sinks. When this takes place, however, there may be an oxidation of proteins to make heat. This condition is found in the hibernating animals, in those in a state of aestivation, and again there is little doubt but that it takes place with the bat during diurnation, should he be very thin. In hot baths in which the internal temperature is raised protein decomposition is increased.

Salt or gas mineral baths probably have no effect on the conversion of proteins except in the ways just named.

The diminution of cutaneous excretion during bathing is so slight as to be ignored, especially as the lungs are more active.

It has not been proven that prolonged warm baths of any kind produce an alkaline urine.

The bath has certain distinct effects on the circulation and respiration. In a cold bath there is considerable contraction of the cutaneous vessels. This is greatest at or during the fore part of the bath and remits during the bath. If this is long continued we have a loss of tone of the vessel walls.

A bath in water hotter than the body heat will produce a relaxation of the vessels. This will often continue for several hours after the bath. It is for this reason that it is well to contract the vessel walls by a dash of cooler water when about to emerge from the bath, otherwise, if exposed to the cold air with the relaxed condition of the blood vessels, where there is an abnormal amount of evaporation going on, the body is apt to become cold. The vascular relaxation of the blood vessels caused by prolonged cold or warm baths would appear to be increased by the addition of either salt or gas to the water bathed in.

Usually the pulse is retarded by a cold bath. This, however, is often preceded by an acceleration.

You will generally find that the pulse frequency is increased in all baths at the temperature of the skin and upward.

Although thermally indifferent baths are also indifferent in their action on the circulation, those with saline constituents induce slight cutaneous hyperaemia.

While observers vary regarding the effects of cold on the frequency of respiration, they all agree that the amount respired is increased. The indifferent baths have no marked influence on respiration, nor is the presence of saline or gaseous constituents shown to be thus active.

The bath also has an influence on the nervous system.

Short cold baths produce a feeling of glow and of nervous excitment and of increased muscular power.

Prolonged warm baths, hot and vapor baths are usually relaxing, fatiguing, and induce sleep. This latter effect is not certain, which is probably due to reflex effects on the vessels of the brain. Warm baths relieve cramps, and reflexes, and contractions of the voluntary muscles, as well as uterine colic, colic of the bladder, kidneys, spasms of the sphincters, tetanus, &c. Cold baths stimulate reflex movements.

Lukewarm baths soothe the peripheral ends of the sensory nerves and diminish the excitement of various centres.

There is little or no water absorbed by the skin, while some of the gases and salts are likely absorbed.

It may be interesting to enumerate a few of the baths in use in different parts of the world, giving a short description of some of the processes as carried on in the more important ones.

Many of them need only the briefest mention, for instance the Animal bath, which consists in immersing the body in cow dung or in the entrails of a freshly slaughtered ox. This is generally done by introducing the body into the abdominal cavity of a freshly slaughtered beast. Another unusual bath is given in the medium of crushed ants. Dish water baths used to be largely used in some parts of Europe. This might be classed as a nutritive one. Ash baths are those where the body is immersed in a bed of ashes in the same manner as we bury the body in the sand bath of today.

The mud bath consists in the application of mud which has been allowed to settle from the water of mineral springs, containing both the salts of the water and the animal and vegetable matter. In Europe this is used for patients suffering from rheumatism and gout. Certain special mud baths contain the remains of many minute and sharp shelled organisms. These acicular siliceous shells irritate the skin and stimulate the peripheral nerves.

The Gelatin bath is in contrast to these mud baths. It is prepared by dissolving gelatin in water. It is used where there is skin irritation. The Brine bath contains 3% of common salt or chloride of sodium. Its use is to stimulate the skin.

The Sun bath consists in exposing the naked body to the direct rays of the sun. It is used to produce a tonic and stimulating effect.

The term Gas bath is usually applied to those composed of carbon dioxide, hydrogen sulphide, ozone or oxygen. These are generally local baths applied to the mucuous membrane.

Besides these we have the Nutritive and Stimulant baths, such as the Milk, Blood, Whey, Grape, Alcohol, Malt Baths.

The Bran bath which is an emollient consisting of bran and water has been used to soften ulcers, eczema and to protect burns.

Pine leaf baths are made of an extract of the leaves added to water. The evaporation of this bath has a soothing effect upon the mucuous membrane of the air passages. These baths are strongly stimulant to the skin at a lower temperature than an ordinary hot bath. They are thought to be of advantage in cases of chronic rheumatism.

The important baths are the water baths of different temperatures, the vapor baths and the air baths.

An Air bath is one in which the body is exposed to dry air, which may stand at any desired temperature. They do not impede the air passages as the vapor baths do by depositing moisture on the mucous membrane.

They produce profuse perspiration and are used in various diseases, to marked advantage in uraemia. This bath can be applied in various ways. The patient can be placed on a cane bottomed chair, having a wrap fastened close around the neck and hanging to the floor on all sides, while a spirit lamp is placed on the floor beneath the chair. This same principle may be used with a cane bottomed sofa or with several chairs arranged side by side, so as to permit the person to retain or assume a recumbent position. If you desire to keep the person in bed two pipes can be placed under the covers just below the feet of the patient. One pipe should fit inside the other, the inside one having about half the diameter of the outside one. The latter need only reach a few inches outside of the covers, while the smaller pipe should be three or four inches longer at each end, having a right angle bend at one end to receive a piece of pipe long enough to reach the floor. The end next the floor must have several holes pierced through it or simple nicks cut along the edge so as to admit air to feed the flame of an alcohol lamp which should be placed on the floor immediately under the pipe. The space between the two pipes should be closed where the smaller one emerges from the larger one so as to prevent the air from circulating through.

The Turkish bath is a hot air bath. In taking this form of bath the person first enters the frigidarium or cool room, the temperature of which is about 80° F. Here he disrobes. He next enters the tepidarium where the temperature is up to 120° F. In this room he reclines either in an easy chair or on a bench for about fifteen minutes. If sufficiently strong he passes into a room having a still higher temperature. From this he enters the calidarium where he undergoes a shampooing and massage and douching. From the calidarium he either passes under a shower with a temperature of about 100° F. or plunges into a cold bath. This plunge should be taken while the body is warm otherwise there is danger of being chilled.

The Indian bath is similar to the Turkish with the exception that in the former the bather is submitted to a much longer massage.

A Vapor bath or a Russian bath is taken in an atmosphere charged with moisture. The usual method of administering a regular Russian bath is by placing the person in a room filled with vapor which often reaches 132° F. The room should be arranged with benches placed one above the other so that the bather can gradually ascend into a hotter atmosphere. While on the bench he is submitted to a shampooing, douches of hot water, and flagellation. In some countries this latter is carried to great extremes by the free administration of the birch switch. After remaining in the hot room for fifteen or twenty minutes he is taken into the cool room or in some of the Russian cities the bather is required to roll in the snow immediately after the steam bath. This change from the hot to the cold and from the cold to the hot is repeated several times. This, or the Turkish bath, is contra-indicated by heart disease, aneurysm, and when there is a general want of tone. A vapor bath can also be administered by substituting for the spirit lamp used in the hot air bath a vessel of hot water into which hot bricks or irons are placed, to generate steam or vapor.

The water of a cold bath ranges from 50° to 70° F. If the temperature should fall below 50° F. it is termed a very cold bath. When the water ranges from 85° to 95° F. it is a tepid bath, whereas a temperate bath ranges from 77° to 86° F. The temperature of the *warm bath* stands between 96° and 104° F., while the *hot bath* runs from 102° to 110° F. Above 110° it is termed a *very hot* bath and should be used with great caution.

Rarefied and compressed air baths are not much used at the present time. From what has been said it is evident that the bath is made the vehicle of heat and cold from the utmost limit of endurance to the slightest variation from the existing temperature. At either extreme the action upon the nerves is that of a counter-irritant. It either causes an arrest or a diversion of the blood.

Cold baths refresh by exciting the functions. They are useful when the system requires a tonic and when it can bear the shock. I am of the opinion that, in health, in youth and up to about fifty years of age, a cold bath should be taken the first thing in the morning. It then excites to action the functions that in many persons have got into a more or less morbid condition during the night. The body is generally well supplied with heat at that time of the day and can best bear the abstraction. This kind of bath should never be indulged in if protracted labor or exercise have left the body exhausted. Alexander the Great nearly perished from plunging into a river after a long and fatiguing march. The Duchess of Beaufort died in a moment from plunging her feet into a tub of cold water after coming home from a ball. The weakling and the sick should always take medical advice on bathing.

As a part of nautical hygiene bathing in sea water has been practiced by the crews of ships of war in tropical regions, and it is claimed with considerable benefit. Cold baths are of much benefit to those who enjoy what is called good health, yet are liable to colds and rheumatic pains from the least exposure to cold air. In such cases there is often to be found an excitable vaso-motor system; they are easily thrown into a perspiration. This may be brought about by the least exercise, or by exposure to a warm atmosphere. This too easily excited system can often be regulated so that the functions of the skin will be better performed by the use of the cold bath. It renders the skin less liable to sweat so freely from exposure to external warmth and prevents the subsequent languor and susceptibility to morbid and enfeebling agencies. This method of toning up the system is often spoken of as a form of gymnastics for the vaso-motor nervous system and the muscles of the blood vessels.

A warm bath elevates the temperature of the body both by bringing heat to it and by preventing the loss of heat by radiation or conduction. It draws blood to the surface; in this it is quite different than the cold bath which favors congestion. This is the bath for one who is fatigued with over labor. It supplies additional heat and thereby lessens the demand supplied by oxydation. This bath is better suited for the delicate, the very young, and the very old person; for those having very weak hearts, and those suffering from any obstruction of the circulation. Full blooded persons, the very fat and those inclined to epilepsy must be very cautious in taking such baths and should particularly avoid very hot baths. The warm bath has many advantages as a cleansing agent when taken at night with the possibility of getting into bed at once without any special exposure to the cold. Under similar conditions it is often, particularly if decidedly prolonged, an admirable promoter of sleep and much more desirable for this purpose than any "coal tar product," but is a method for procuring sleep which requires care in its employment. The soporific bath must not be too hot and it must not be allowed to become cold while in use. This difficulty is easily avoided by adding from time to time a small amount of hot water. Any cold douche or much rubbing, more than is merely necessary to dry the body, may easily call up the imps of wakefulness.

As to the frequency of the bath, it may be said that this largely depends upon the exposure of the body to dirt and also upon the occupation of the individual. Twice a week will answer in general, if a tepid or warm bath be used for the purpose of cleanliness. If a methodical course of warm bathing is instituted, the immersion should be daily unless followed by unpleasant symptoms. The hygiene of bathing is incomplete without the aid of those processes known as friction or rubbing the skin with strigils, coarse towels, or brushes.

Various peoples have had the custom of supplementing the bath with some form of anointing the body by rubbing into the skin a mild oil—usually one of vegetable origin. Although this practice seems to have been quite wide spread and still exists, very little is known as to the benefit or disadvantage of this procedure. The fact that it has not attained much prominence in the temperate zones is at least suggestive.

Medicated baths do not come within the jurisdiction of preventive medicine, and if they did, I am not sure that I should have much to say about them unless some new methods were discovered. It must be added, however, that the recently discovered presence of radium emanations in many springs which have long enjoyed a great reputation for the cures they have wrought and in fact their wide spread presence in waters of less renown has given us a new point of view concerning the possible value of *mineral* waters, whether taken internally or applied externally. Our information is as yet too scanty to permit any very positive conclusions about the effect of this condition on the special balneological value of any spring.

Except for this peculiarity and possibly some colloidal conditions, as yet equally difficult to interpret, the natural spring water used for bathing can be very closely imitated, but the open sea surf bathing cannot. Not only do you have the effects of the salt and the pure air, which latter is taken in with increased vigor when in bathing, but you have the friction of the water dashing against the body, and the exercise caused by resisting the force of the water and the effort to retain the equilibrium of the body.

A sea bath should never be taken when the body is fatigued or cold. It should never be taken on a full stomach, nor by the very old or the very young. Those with weak hearts should never indulge in sea bathing. Those with a tendency to local determination of blood and those with chronic lung troubles must abstain also. In speaking of sea bathing I advise you that no matter how healthy the bather may be he should never remain in the water sufficiently long to reduce the body temperature below normal or until he feels chilly. After disrobing the bather should get into the water as soon as possible. Upon going into the surf the individual should immediately immerse the body so that the entire surface may be stimulated at one and the same time. If a plug of cotton or wool is placed in each ear it is well to go in head foremost.

Immediately upon coming out the body should be well rubbed. Unless it is during very warm weather it is well to advise a short brisk walk taken as soon as dressed.

Such moderation as to sea bathing, to getting in as well as to coming out, is easily advised but few persons who have ever enjoyed a good sun bath on the sand or the bathing platform between "dips" will be ready to take such advice seriously. Any physician who has the chance to watch the summer bathers in the sea—or in fresh water for the matter of that—during a long summer sees many persons who do themselves harm quite as much by the overstimulation of their air baths in wet bathing suits as by the actual sojourn in the water. And it may be said finally of all bathing that it is easily overdone and is in fact often overdone.

PENNSYLVANIA HEALTH BULLETINS.

No.	Date.	Subject.
1.	July, 1909,	The Disease-Breeding Power of House-flies; Methods of Prevention.
2.	Aug., 1909,	Note on the Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	The Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, Bacillus Coli, and Bacillus Anthracis.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be avoided in the Daily Fight against Tuberculosis.
8.	Feb., 1910,	The Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Pennsylvania. The Results of Four Years' Work of the Department.
10.	April, 1910,	The Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress, and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin, and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	The Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals, and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused, and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly, How it Develops, Why it must be Destroyed, and How to Destroy it.
24.	June, 1911,	Effects of Products of Tubercle Bacilli on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Pennsylvania State Department of Health.
27.	Sept., 1911,	Tuberculosis, in the Country as well as in the City, a Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biological Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from Pulmonary Tuberculosis.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects. The Common Forms in Relation to Public Health, and Methods for their Destruction.
33.	Mar., 1912,	The Opportunities for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Conservation of Health. An Address before the Duquesne Chamber of Commerce.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	Tuberculosis and our Schools.
44.	Mar., 1913,	The Relation of the Undertaker to the Public Health.
45.	April, 1913,	What State Control over Streams has done in Pennsylvania in Seven Years.
46.	May, 1913,	Troy Typhoid Fever Epidemic.
47.	June, 1913,	The Registration of Vital Statistics a Social Service.
48.	July, 1913,	Pennsylvania's Eugenic Marriage Law.
49.	Aug., 1913,	Pennsylvania Health Legislation of 1913.
50.	Sept., 1913,	Health and Education. An Address before the Pennsylvania State Educational Association.
51.	Oct., 1913,	Relation of Public Health to Industrial Welfare. An Address before the Welfare Efficiency Conference at Harrisburg.
52.	Nov., 1913,	Bathing.

4126

PENNSYLVANIA
Health Bulletin

STATE LIBRARY
JUN 1 1914

No. 53. HARRISBURG, PA. December, 1913

Entered as second-class matter, August 9, 1909, at the Post-office at Harrisburg, Pa., under the Act of July 16, 1894.

WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

RESULTS FROM THE INJECTION OF THE WAX OF THE TUBERCLE BACILLUS INDICATING ITS INFLUENCE ON IMMUNITY AND SUSCEPTIBILITY TO THE TUBERCLE BACILLUS.

DEPARTMENT OF HEALTH LABORATORIES.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 53. HARRISBURG, PA. December, 1913.

Results From the Injection of the Wax of the Tubercle Bacillus Indicating its Influence on Immunity and Susceptibility to the Tubercle Bacillus.

Several years ago Drs. Dixon and Fox ran a series of experiments in this laboratory by injecting large doses (0.5 milligram) of the tubercle bacillus wax into some bovines to determine whether or not it was at all a prophylactic against tuberculosis. The result was decidedly negative with an intimation of the animals becoming hypersensitive to the tuberculous infection.

The following report is upon the result of a series of injections of wax of the tubercle bacilli given in minute graduated doses. The experiments were made by Drs. Dixon and Rucker.

This work was begun Jan. 7, 1913. In carrying it on four sets of guinea pigs were used. The first set, of three pigs, was started on injections of one ten-thousandth of a milligram (0.0001 mg.) of bacillar wax in sterile oil. After two weeks this injection was repeated. The third injection, a week later, contained two ten-thousandths of a milligram, and was repeated the next week. With an interval for rest, the doses were thus repeated and increased by a ten-thousandth of a milligram until a dose of five ten-thousandths of a milligram had been given. The guinea pigs were then allowed to rest for five weeks. After this rest injections were begun again, using 0.0005 mg. of wax and 0.1 mg. of living human tubercle bacilli. This was continued weekly in such a fashion that the doses of wax were increased every other week by one ten thousandth of a milligram, each alternate dose carrying with it 0.1 mg. of the bacilli. On July 15th the last injection (0.0009 mg. wax and 0.1 mg. bacilli) was given. The succession of these injections as well as the periods of rest may be followed in the table.

The second series, of six pigs, received injections of wax, or of wax and bacilli, in the same manner and on the same days as the pigs of the first series, save that the initial dose of wax was one thousandth of a milligram with a gradual increase by the same amount until the final dose of 0.009 mg. of wax was attained. The amount of bacilli, when these were injected, was exactly the same as in the first series, that is 0.1 mg.

In the third series, also of six pigs, precisely the same plan was followed. The first dose contained 0.01 mg. of wax and the same amount was the increment as the dose was increased. Thus the pigs of this series received ten times as much wax as those of the second series and a hundred times as much as the pigs of the first series at each injection. When the bacilli were added, the amount was again the same (0.1 mg.) as in the other series.

The fourth series contained three pigs to serve as a control. These pigs received injections of sterilized olive oil, always to the amount of one cubic centimetre. Such an injection was given on the same days as the wax in the other series, and when those pigs received bacilli these control pigs also had added to the sterile oil exactly the same amount of bacilli (i. e. 0.1 mg.). In the fourth set, as in each of the other sets, the injections were all given on the same days, and exactly the same periods of rest were allowed, as the table clearly shows.

In the preparation of the wax an etheral solution was made by continuous extraction for 120 hours in a Soxhlet apparatus and then filtered through a porcelain candle. The filtrate was evaporated to dryness and the residue ("Wax") was dissolved in hot benzol and precipitated with absolute alcohol. This precipitate was again dissolved in benzol and the wax re-precipitated with absolute alcohol. This purified wax was then weighed and emulsified in sterile olive oil so that one cubic centimetre of the emulsion was equivalent to one milligram of the wax. Dilutions in sterile olive oil were made from this stock. Before each series of injections the emulsion was heated to 100° C. in streaming steam for thirty minutes to ensure sterility of the wax.

The culture of the human tubercle bacillus used in these immunity tests was one of low virulence, such that a single injection of one milligram into a guinea pig of 350 gm. caused death in about fourteen weeks. It was thought best to use such a culture because any immunity to the tubercle bacillus produced by the injections of wax would assert itself more distinctly and certainly against this feeble micro-organism than against one of such potent pathogenicity that a slight degree of resistance would be overwhelmed by the virulence of the organism. All injections were given subcutaneously.

Before the injections of tubercle bacilli were begun nodules formed on nearly all the wax pigs at or near the point of injection. On incision the nodules were found to be made up of a cheesy mass, some of almost fluid consistency, and others hard, like the meat of a chestnut just ripening. In every instance where incision was made this cheesy material contained acid-fast micro-organisms of the morphology of the tubercle bacillus. Sometimes the nodules formed and if not incised, spontaneously disappeared in a few weeks. In one or two instances the nodules broke down and sero-purulent material containing acid-fast organisms of tubercle bacillus morphology were exuded and the lesion afterwards healed.

Before this report was finished all the pigs had died. Prior to the injection of the bacilli four pigs were dead, among them unfortunately, one belonging to the set of controls. One pig, late in the investigation, (No. 1442) was killed because of pronounced dyspnoea when death was unquestionably imminent. All these pigs were included in the autopsy findings reported below. It is desirable to lay stress on the fact that the tuberculous lesions were as great in extent and in degree in the wax pigs as in the controls. This is equally true of the microscopical examinations which in smears and sections revealed only the human type of tubercle bacillus with no branchings nor other forms of involution or degeneracy, nor mutations.

EXPERIMENTS OF 1913 ON THE IMMUNITY AGAINST TUBERCULOSIS CONFERRED BY THE WAX OF THE TUBERCLE BACILLUS.

Pigs by No.	Jan.				Feb.					March.		Apr.		May.				June.				July.		Date and Cause of Death.
	7		21	28	4	11	18	25		18	25	1		6	13	20	27	3	10	17		8	15	
1453	0.0001 mg. wax.	No injections. Rest of two weeks.	0.0001 mg. wax.	0.0002 mg. wax.	0.0002 mg. wax.	0.0003 mg. wax.	0.0003 mg. wax.	0.0004 mg. wax.	Pigs losing weight. Rest for three weeks. No injections.	0.0004 mg. wax.	0.0005 mg. wax.	0.0005 mg. wax.	Rest of five weeks before injections of bacilli.	0.0005 mg. wax. +0.1 mg. TB.	0.0006 mg. wax.	0.0006 mg. wax. +0.1 mg. TB.	0.0007 mg. wax.	0.0007 mg. wax. +0.1 mg. TB.	0.0008 mg. wax.	0.0008 mg. wax. +0.1 mg. TB.	Rest of three weeks for recuperation.	0.0009 mg. wax.	0.0009 mg. wax. +0.1 mg. TB.	9-6-13. Generalized tuberculosis.
1454	0.0001 mg. wax.		0.0001 mg. wax.	0.0002 mg. wax.	0.0002 mg. wax.	0.0003 mg. wax.	0.0003 mg. wax.	0.0004 mg. wax.		0.0004 mg. wax.	0.0005 mg. wax.	0.0005 mg. wax.		0.0005 mg. wax. +0.1 mg. TB.	0.0006 mg. wax.	0.0006 mg. wax. +0.1 mg. TB.	0.0007 mg. wax.	0.0007 mg. wax. +0.1 mg. TB.	0.0008 mg. wax.	0.0008 mg. wax. +0.1 mg. TB.		0.0009 mg. wax.	0.0009 mg. wax. +0.1 mg. TB.	12-2-13. Generalized tuberculosis.
1455	0.0001 mg. wax.		0.0001 mg. wax.	0.0002 mg. wax.	0.0002 mg. wax.	0.0003 mg. wax.	0.0003 mg. wax.	0.0004 mg. wax.		0.0004 mg. wax.	0.0005 mg. wax.	0.0005 mg. wax.		0.0005 mg. wax. +0.1 mg. TB.	0.0006 mg. wax.	0.0006 mg. wax. +0.1 mg. TB.	0.0007 mg. wax.	0.0007 mg. wax. +0.1 mg. TB.	0.0008 mg. wax.	0.0008 mg. wax. +0.1 mg. TB.		0.0009 mg. wax.	0.0009 mg. wax. +0.1 mg. TB.	8-8-13. Generalized tuberculosis.
1438	0.001 mg. wax.		0.001 mg. wax.	0.002 mg. wax.	0.002 mg. wax.	0.003 mg. wax.	0.003 mg. wax.	0.004 mg. wax.		0.004 mg. wax.	0.005 mg. wax.													4-1-13. Pneumonia.

Pigs by No.	Jan.				Feb.					March.		Apr.		May.				June.				July.		Date and Cause of Death.
	7		21	28	4	11	18	25		18	25	1		6	13	20	27	3	10	17		8	15	
1439	0.001 mg. wax.	No injections. Rest of two weeks.	0.001 mg. wax.	0.002 mg. wax.	0.002 mg. wax.	0.003 mg. wax.	0.003 mg. wax.	0.004 mg. wax.	Pigs losing weight. Rest for three weeks. No injections.	0.004 mg. wax.	0.005 mg. wax.	0.005 mg. wax.	Rest of five weeks before injections of bacilli.	0.005 mg. wax. +0.1 mg. TB.	0.006 mg. wax.	0.006 mg. wax. +0.1 mg. TB.	0.007 mg. wax.	0.007 mg. wax. +0.1 mg. TB.	0.008 mg. wax.	0.008 mg. wax. +0.1 mg. TB.	Rest of three weeks for recuperation.	0.009 mg. wax.	0.009 mg. wax. +0.1 mg. TB.	7-23-13. Generalized tuberculosis.
1440	0.001 mg. wax.		0.001 mg. wax.	0.002 mg. wax.	0.002 mg. wax.	0.003 mg. wax.	0.003 mg. wax.	0.004 mg. wax.		0.004 mg. wax.	0.005 mg. wax.	0.005 mg. wax.		0.005 mg. wax. +0.1 mg. TB.	0.006 mg. wax.	0.006 mg. wax. +0.1 mg. TB.	0.007 mg. wax.	0.007 mg. wax. +0.1 mg. TB.	0.008 mg. wax.	0.008 mg. wax. +0.1 mg. TB.		0.009 mg. wax.	0.009 mg. wax. +0.1 mg. TB.	9-2-13. Generalized tuberculosis.
1441	0.001 mg. wax.		0.001 mg. wax.	0.002 mg. wax.	0.002 mg. wax.	0.003 mg. wax.	0.003 mg. wax.	0.004 mg. wax.		0.004 mg. wax.	0.005 mg. wax.	0.005 mg. wax.												4-3-13. Generalized purulent peritonitis—tubercular in origin.
1442	0.001 mg. wax.		0.001 mg. wax.	0.002 mg. wax.	0.002 mg. wax.	0.003 mg. wax.	0.003 mg. wax.	0.004 mg. wax.		0.004 mg. wax.	0.005 mg. wax.	0.005 mg. wax.		0.005 mg. wax. +0.1 mg. TB.	0.006 mg. wax.	0.006 mg. wax. +0.1 mg. TB.	0.007 mg. wax.	0.007 mg. wax. +0.1 mg. TB.	0.008 mg. wax.	0.008 mg. wax. +0.1 mg. TB.		0.009 mg. wax.	0.009 mg. wax. +0.1 mg. TB.	Killed 11-12-13 because of marked dyspnoca. Autopsy showed generalized tuberculosis.

EXPERIMENTS OF 1913 ON THE IMMUNITY AGAINST TUBERCULOSIS CONFERRED BY THE WAX OF THE TUBERCLE BACILLUS—Continued.

Pigs by No.	Jan.				Feb.					March.		Apr.		May.				June.				July.		Date and Cause of Death.
	7		21	28	4	11	18	25		18	25	1		6	13	20	27	3	10	17		8	15	
1443	0.001 mg. wax.	No injections. Rest of two weeks.	0.001 mg. wax.	0.002 mg. wax.	0.002 mg. wax.	0.003 mg. wax.	0.003 mg. wax.	0.004 mg. wax.	Pigs losing weight. Rest for three weeks. No injections.	0.004 mg. wax.	0.005 mg. wax.	0.005 mg. wax.	Rest of five weeks before injections of bacilli.											4-3-13. Generalized purulent peritonitis—tubercular in origin.
1444	0.01 mg. wax.		0.01 mg. wax.	0.02 mg. wax.	0.02 mg. wax.	0.03 mg. wax.	0.03 mg. wax.	0.04 mg. wax.		0.04 mg. wax.	0.05 mg. wax.	0.05 mg. wax.		0.05 mg. wax. +0.1 mg. TB.	0.06 mg. wax.	0.06 mg. wax. +0.1 mg. TB.	0.07 mg. wax.	0.07 mg. wax. +0.1 mg. TB.	0.08 mg. wax.	0.08 mg. wax. +0.1 mg. TB.	Rest of three weeks for recuperation.	0.09 mg. wax.	0.09 mg. wax. +0.1 mg. TB.	7-19-13. Generalized miliary tuberculosis.
1445	0.01 mg. wax.		0.01 mg. wax.	0.02 mg. wax.	0.02 mg. wax.	0.03 mg. wax.	0.03 mg. wax.	0.04 mg. wax.		0.04 mg. wax.	0.05 mg. wax.	0.05 mg. wax.		0.05 mg. wax. +0.1 mg. TB.	0.06 mg. wax.	0.06 mg. wax. +0.1 mg. TB.	0.07 mg. wax.	0.07 mg. wax. +0.1 mg. TB.	0.08 mg. wax.	0.08 mg. wax. +0.1 mg. TB.		0.09 mg. wax.	0.09 mg. wax. +0.1 mg. TB.	7-19-13. Generalized miliary tuberculosis.
1446	0.01 mg. wax.		0.01 mg. wax.	0.02 mg. wax.	0.02 mg. wax.	0.03 mg. wax.	0.03 mg. wax.	0.04 mg. wax.		0.04 mg. wax.	0.05 mg. wax.	0.05 mg. wax.		0.05 mg. wax. +0.1 mg. TB.	0.06 mg. wax.	0.06 mg. wax. +0.1 mg. TB.	0.07 mg. wax.	0.07 mg. wax. +0.1 mg. TB.	0.08 mg. wax.	0.08 mg. wax. +0.1 mg. TB.		0.09 mg. wax.	0.09 mg. wax. +0.1 mg. TB.	7-21-13. Generalized miliary tuberculosis.

Pigs by No.	Jan.				Feb.				March.			Apr.		May.				June.				July.		Date and Cause of Death.
	7		21	28	4	11	18	25		18	25	1		6	13	20	27	3	10	17		8	15	
1447	0.01 mg. wax.	No injections. Rest of two weeks.	0.01 mg. wax.	0.02 mg. wax.	0.02 mg. wax.	0.03 mg. wax.	0.03 mg. wax.	0.04 mg. wax.	gs losing weight. Rest for three weeks. No injections.	0.04 mg. wax.	0.05 mg. wax.	0.05 mg. wax.	Rest of five weeks before injections of bacilli.	0.05 mg. wax. +0.1 mg. TB.	0.06 mg. wax.	0.06 mg. wax. +0.1 mg. TB.	0.07 mg. wax.	0.07 mg. wax. +0.1 mg. TB.	0.08 mg. wax.	0.08 mg. wax. +0.1 mg. TB.	Rest of three weeks for recuperation.	0.09 mg. wax.	0.09 mg. wax. +0.1 mg. TB.	7-23-13. Generalized miliary tuberculosis.
1448	0.01 mg. wax.		0.01 mg. wax.	0.02 mg. wax.	0.02 mg. wax.	0.03 mg. wax.	0.03 mg. wax.	0.04 mg. wax.		0.04 mg. wax.	0.05 mg. wax.	0.05 mg. wax.		0.05 mg. wax. +0.1 mg. TB.	0.06 mg. wax.	0.06 mg. wax. +0.1 mg. TB.	0.07 mg. wax.	0.07 mg. wax. +0.1 mg. TB.	0.08 mg. wax.	0.08 mg. wax. +0.1 mg. TB.		0.09 mg. wax.	0.09 mg. wax. +0.1 mg. TB.	7-18-13. Generalized purulent peritonitis—tubercular in origin.
1449	0.01 mg. wax.		0.01 mg. wax.	0.02 mg. wax.	0.02 mg. wax.	0.03 mg. wax.	0.03 mg. wax.	0.04 mg. wax.		0.04 mg. wax.	0.05 mg. wax.	0.05 mg. wax.		0.05 mg. wax. +0.1 mg. TB.	0.06 mg. wax.	0.06 mg. wax. +0.1 mg. TB.	0.07 mg. wax.	.07 mg. wax. +0.1 mg. TB.	0.08 mg. wax.	0.08 mg. wax. +0.1 mg. TB.				6-28-13. Generalized purulent peritonitis—tubercular in origin.

EXPERIMENTS OF 1913 ON THE IMMUNITY AGAINST TUBERCULOSIS CONFERRED BY THE WAX OF THE TUBERCLE BACILLUS—Continued.

Pigs by No.	Jan.				Feb.					March.		Apr.		May.				June.				July.		Date and Cause of Death.
	7		21	28	4	11	18	25		18	25	1		6	13	20	27	3	10	17		8	15	
1450 (Control.)	1 c. c. oil.	No injections. Rest of two weeks.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	Pigs losing weight. Rest for three weeks. No injections.				Rest of five weeks before injections of bacilli.								Rest of three weeks for recuperation.			3-18-13. Unknown.
1451 (Control.)	1 c. c. oil.		1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.		1 c. c. oil.	1 c. c. oil.	1 c. c. oil.		1 c. c. oil. +0.1 mg. TB.	1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.	1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.	1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.		1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.	9-22-13. Generalized tuberculosis.
1452 (Control.)	1 c. c. oil.		1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.	1 c. c. oil.		1 c. c. oil.	1 c. c. oil.	1 c. c. oil.		1 c. c. oil. +0.1 mg. TB.	1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.	1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.	1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.		1 c. c. oil.	1 c. c. oil. +0.1 mg. TB.	10-20-13. Generalized tuberculosis.

AUTOPSY FINDINGS.

G. P. 1438. Died 4-1-13. Pneumonia. Died before inoculation with. bacilli Lungs: congested. Lower lobes pneumonic. No tubercles. Liver: congested. No tubercles. Spleen: normal. Stomach: Normal and empty. Kidneys and Adrenals: normal. Slight enteritis. Inguinal glands: slightly enlarged, but not caseous.

G. P. 1439. Died 7-23-13. Tubercular peritonitis. Mediastinal, bronchial, and axillary glands: caseous. Lungs: tuberculous pneumonia Liver: miliary tubercles. Spleen: adherent to abdominal wall and abdominal organs; soft and pulpy. Kidneys and Adrenals: bound down by adhesions. Mucilaginous fluid in peritoneal cavity which shows presence of tubercle bacilli when stained.

Histological Notes: Lung: vesicles filled with pneumonic exudate Moderate capillary bronchitis. Blood vessels congested. No tubercles. Tubercle bacilli present. Liver: chronic passive congestion. Fatty degeneration of many of the liver cells. No tubercles. No cirrhosis, nor bile duct proliferation is seen. Tubercle bacilli not found. Spleen: tuberculous splenitis, showing tubercles and a moderate over-growth of fibrous tissue. Tubercle bacilli present. Kidney: vessels are congested. Cells of tubules show a moderate degree of cloudy swelling. Haemorrhage into some of the tubules is evident. As a whole the section shows an acute nephritis. No tubercles, no bacilli.

G. P. 1440. Died, 9-2-13. Lungs: tubercles of caseous type. Section shows pneumonia. Liver: three times the normal size, and dun colored. Granular surface, and rather hard to cut. Spleen: about three times the normal size, greatly congested and full of precaseous tubercules. Kidneys: normal in size and appearance. Lymph glands around bronchi enlarged and not caseous.

Histological notes: Lung: caseous tuberculosis, with infiltration of lung tissue with fibrous tissue. Tubercle bacilli present. Liver: fatty degeneration of liver cells in such a degree that only in a small portion of the section are they recognizable as such. It appears that there have been tubercles in the liver, but they have been so overgrown with fibrous tissue that they are no longer distinctly seen. A fibrous growth infiltrates the whole liver substance. Epithelial cell proliferation is excessive in this section. No tubercle bacilli. Spleen: chronic tubercular splenitis. Splenic pulp completely infiltrated with fibrous tissue. Most of the tubercles have been resolved into fibrous nodules. Tubercle bacilli present. Kidneys: acute parenchymatous nephritis. No tubercles nor bacilli.

G. P. 1441. Died, 4-3-13. General purulent peritonitis. Died before inoculation with bacilli. Lungs: grayish and black in spots. Heart and Kidneys: Normal. Spleen: congested and very much enlarged. No tubercules. Bronchial glands: enlarged. Omentum: matted and curled up. Intestines: covered with mucilaginous exudate which showed very few tubercle bacilli, but numerous pus cells and diplococci. Liver: congested; several small areas of focal degeneration. Inguinal Glands: not enlarged. Firm cheesy nodule in left loin near inoculation sites.

Histological Notes: Bronchial lymph glands: a great amount of fibrous tissue and cellular exudate is seen. Identity of lymphoid tissue is almost totally lost. Tubercles abound. Tubercle bacilli present. Lungs: both solid with cellular and fibrinous exudate. Tubercles are numerous. Bacilli present. Liver: areas of focal degeneration. A few tubercles. Some reduplication of epithelial cells in region of bile ducts. Pyknosis of liver cell nuclei. Tubercle bacilli present. Omentum: tuberculous inflammation with infiltration of lymphoid and epitheloid cells forming tubercles. Tubercle bacilli present. Inguinal Lymph Gland: pulp destroyed; much fibrous tissue present. Tubercles abound. Tubercle bacilli present.

G. P. 1442. Killed, 11-12-13, because of intense dyspnoea. Bronchial and Mediastinal Glands: greatly enlarged and hard. Lungs: completely filled with hard fibrous nodules. Liver: congested, with areas of degeneration here and there. Spleen: enlarged and congested, showing many large, yellow, caseous tubercles. Kidneys: normal in appearance. Inguinal Glands: caseous. Tubercle bacilli present in pus.

Histological Notes: Lungs: vesicles filled with tuberculous exudate, throughout which are scattered numerous large tubercles. This exudate and the tubercles have been largely organized into fibrous tissue. No proliferation of bronchial epithelium into the lung tissue. Tubercle bacilli present. Liver: very marked fatty degeneration of the parenchymal cells. Very little fibrous infiltration of the liver substance and no reduplication of biliary epithelium. In many places tubercles surround the portal region. Tubercle bacilli present. Spleen: caseous tuberculosis. There is not much fibrous tissue invasion of the lymphoid tissue. Tubercle bacilli present. Kidneys: slight degree of cloudy swelling of the tubular epithelium; small amount of haemorrhage into the tubules. No tubercles. Tubercle bacilli not found. Lymph Nodes: caseous tuberculosis.

G. P. 1443. Died, 4-3-13. Generalized purulent peritonitis. Died before inoculation with bacilli. Lungs and Heart: normal in appearance. Liver: congested. One or two areas of degeneration were seen. Spleen: congested and slightly enlarged. Omentum: matted together and curled up. Intestines: covered with a creamy mucilaginous exudate which on staining showed diplococci and a very few tubercle bacilli. Inguinal Glands: not enlarged. Kidneys: normal. Firm cheesy lump found at inoculation sites in the loin under the skin.

Histological Note: Liver: chronic passive congestion and cloudy swelling of liver cells. No tubercles. Tubercle bacilli not found.

G. P. 1444. Died, 7-19-13. Generalized miliary tuberculosis with effusion into pleural and peritoneal cavities. Tubercle bacilli present in both fluids. Mediastinal Glands: enlarged and caseous.

Histological Notes: Lung: nearly solid with tuberculous exudate—only a very few small tubercles in section. Tubercle bacilli abundant in stained section. Liver: fatty degeneration with a few scattered miliary tubercles. Tubercle bacilli plentiful. Spleen: tuberculous splenitis. Malpighian bodies unrecognizable. Great numbers of giant cell tubercles. Tubercle bacilli present in large numbers. Lymph Nodes: tuberculous lymphadenitis—Caseous tubercles. Tubercle bacilli numerous.

G. P. 1445. Generalized miliary tuberculous exudate into pleural and peritoneal cavities. Tubercle bacilli present in smears from both fluids.

Histological Notes: Lung: full of tuberculous exudate. No definite tubercles seen. Tubercle bacilli numerous. Liver: caseous tubercles present. Marked proliferation of bile duct epithelium throughout section. Tubercle bacilli present. Kidney: moderate congestion. Cloudy swelling of tubular cells. Spleen: tuberculous splenitis. Tubercle bacilli present.

G. P. 1446. N. B.—Nodules formed at site of injection. 3-25-13, one of the size of a marble was incised. Small amount of pus, hard and pasty, was pressed out with a large amount of serum. Tubercle bacilli present in the pus. Another guinea pig (G. P. 1468) was inoculated with a portion of this pus and remained in splendid condition; eight months later his weight had increased from 475 grams to 1070 grams.

(1446) Died, 7-21-13. Immediate cause of death, tuberculous peritonitis. Lungs: congested; miliary tubercles. Liver: enlarged and congested. Spleen: soft, and bound down with adhesions; miliary tubercles. Kidneys: large, soft and congested. Adhesions bind down all abdominal organs. A sticky mucilaginous fluid, in which tubercle bacilli are present, fills the peritoneal cavity.

Histological Notes: Lung: filled with tuberculous exudate. A few miliary tubercles are seen. Tubercle bacilli present. Liver: chronic passive congestion and fatty degeneration. No tubercles. Tubercle bacilli present. Spleen: tuberculous splenitis. A few miliary tubercles are seen. Tubercle bacilli present. Kidney: congestion; a slight degree of cloudy swelling. No tubercles. Tubercle bacilli not found.

G. P. 1447. Died, 7-23-13. Tubercular peritonitis; Mediastinal, Bronchial, and Inguinal Glands, cheesy. Pericardium filled with thick, bloody fluid. Lungs: full of caseous tubercles. Liver: large and hobnailed. Caseous tubercles. Spleen: caseous tubercles. Kidneys and Adrenals: bound down by adhesions. Mucilaginous exudate in peritoneal cavity. Tubercle bacilli found in fluid.

Histological Notes: Lung: a few caseous areas are seen among the dense fibrous tisue, which replaces the lung tissue. The bronchioles have been overgrown with fibrous tissue, and where they once were, are seen masses of endothelioid cells, arranging themselves into small acini. Tubercle bacilli are present. Liver: congested. Pale stained areas in which the absence of liver cells is notable, are numerous. These were probably caseous tubercles and have been overgrown with fibrous tissue among the strands of which is seen a very marked proliferation of endothelial cells. Some of these latter are arranged in the form of acini, the basement membrane of which is broken, giving the appearance of adenoma; in these areas are numerous small coccoid, acid-fast granules, but no rods. Spleen: fibrous tuberculosis. No distinct tubercles. Tubercle bacilli not found. Kidney: sub-acute diffuse nephritis. Tubercle bacilli not found. Adrenals: cloudy swelling of parenchymal cells. No tubercles. Tubercle bacilli not found. Lymph Nodes: haemorrhagic. A few tubercles are seen. The pulp is infiltrated with fibrous tissue. Tubercle bacilli present.

G. P. 1448. Died, 7-18-13. Purulent tubercular peritonitis. Lung and Liver: congested. Spleen: mushy and adherent to stomach and abdominal wall. Intestines, Kidneys and Adrenals: matted together. Tubercle bacilli present in peritoneal exudate. Mesenteric glands enlarged.

Histological Notes: Lungs: vessels greatly congested. Vesicles filled with cellular exudate. No tubercles seen. Tubercle bacilli not found. Liver: congestion, fatty degeneration, and miliary tubercles. No proliferation of bile duct epithelium. Tubercle bacilli not found. Spleen: caseous tuberculous splenitis. Tubercle bacilli present. Kidney: congestion and cloudy swelling. No tubercles. Tubercle bacilli not found.

G. P. 1449. Died, 6-28-13. Purulent peritonitis. Bronchial glands not enlarged. Lungs: congested and pneumonic in appearance. Liver:

enlarged and congested. Spleen: soft and haemorrhagic and the organs of the entire abdomen matted together by a sticky exudate, also bound to the parietal wall. Cheesy mass at the site of wax inoculation. Some of the pus stained for tubercle bacilli which were present. Caseous material in nodules showed a few typical acid-fast rods. Remainder mush. Tubercle bacilli in peritoneal exudate.

Histological Notes: Lung: typical exudate of red hepatization stage of pneumonia fills the vesicles. No tubercles found. Liver: chronic passive congestion with slight degree of swelling in some of the cells. No tubercles. Spleen: chronic interstitial splenitis fibrillar rather than trabecular in character. Marked congestion and some oedema.

G. P. 1450. Died, 3-18-13. Died before inoculation with tubercle bacilli. Organs normal. Abscess in pelvic cavity one and one-half inches in diameter. Pus from abscess showed tubercle bacilli.

G. P. 1451. Died, 9-22-13. Mediastinal Glands and Bronchial Glands enlarged but not caseous. Lungs: show caseous tuberculosis with fibrous infiltration. Liver: hard, enlarged, congested, and full of caseous tubercles. Spleen: enlarged, congested, and shows caseous tubercles. Inguinal Glands: enlarged but not caseous.

Histological Notes: Lung: tuberculous pneumonia. Tubercle bacilli present. Liver: marked degree of fatty degeneration. Degenerated areas, probably caseous tubercles, are numerous, but no distinct tubercles are discernible. There is moderate proliferation of bile ducts. Tubercle bacilli present. Spleen: chronic tuberculous splenitis. Pulp nearly entirely displaced by fibrous tissue. Large caseous tubercles abound. Tubercle bacilli present. Kidney: sub-acute diffuse nephritis. Tubercle bacilli not found.

G. P. 1452. Died, 10-20-13. Generalized Tuberculosis.

Histological Notes: Lung: whole section seems to be a mass of tuberculous exudate, most of which has undergone organization. Tubercle bacilli are sparsely scattered throughout. Liver: marked, fatty degeneration of liver cells; chronic hypertrophic cirrhosis. What were once caseous tubercles have been organized into fibrous masses. No proliferation of bile duct epithelium has occurred. A few tubercle bacilli are seen. Spleen: congested and haemorrhagic. Follicles obliterated, caseous tubercles taking their places. There is considerable fibrous infiltration. Tubercle bacilli present. Kidney: blood vessels congested. Haemorrhage into many of the glomeruli and tubules. A marked degree of cloudy swelling in the cells of the tubules. Tubercle bacilli not found.

G. P. 1453. Died, 9-6-13. Generalized Tuberculosis. Caseous tuberculosis of lungs, liver and spleen. Large abscess back of uterus, pus containing tubercle bacilli.

Histological Notes: Lung: caseous tuberculosis with fibrous tissue overgrowth. Much proliferation of epithelioid cells. Tubercle bacilli present. Liver: fatty degeneration. Tubercle formation and a considerable proliferation of epithelioid cells. Tubercle bacilli present. Spleen: caseous tuberculosis. Tubercles have been overgrown with fibrous tissue. Tubercle bacilli present. Kidney: congestion and haemorrhage into tubules. Slight degree of cloudy swelling of tubular epithelium. No tubercles. Tubercle bacilli not found. Lymph Glands: caseous tuberculosis.

G. P. 1454. Died, 12-2-13. Lungs: filled with tubercles—hard and fibrous. Liver: small miliary tubercles are seen. Organ is enlarged, soft and congested. Spleen: adherent to stomach and abdominal wall. Caseous tubercles. Bronchial, Mediastinal, and Inguinal Lymph Nodes: enlarged and hard on the outer surface but inside they contain thin yellow pus.

Histological Notes: Lung: vesicles filled solidly with tuberculous exudate. The lung tissue is haemorrhagic to a great degree. There are several large caseous tubercles in the section. In other places what seem to have been areas of caseation have been organized into fibrous tissue. Distribution of fibrous tissue throughout the lung substance is markedly increased. Quite a marked proliferation of epithelioid cells resembling bronchial epithelium is seen throughout the section. There seems also to be much round cell infiltration, especially around the blood vessels. Bronchial epithelium is piled up and pushed away from the basement membrane and the cells are degenerated. Tubercle bacilli present. Liver: tissue is haemorrhagic. Nearly every cell shows fatty degeneration. The lobules are not defined. Many areas of caseation are seen. There is considerable fibrous tissue infiltration, the fibrous increase being noted particularly in the portal area, where also one finds a small amount of new bile duct proliferation. Tubercle bacilli present. Spleen: typical chronic tubercular splenitis showing caseous tubercles and fibrous infiltration, malpighian bodies being obliterated. Tubercle bacilli present. Kidneys: show only haemorrhage into the tubules and a moderate degree of cloudy swelling of the cells lining the tubules. Tubercle bacilli not found. Heart: no degeneration of the muscle itself, but between the individual muscle bundles there is an ingrowth of fibrous tissue bands. Tubercle bacilli not found.

G. P. 1455. Died, 8-8-13. General Tuberculosis.

Histological Notes: Lung: caseous tuberculosis. No organization of the tuberculous exudate. Tubercle bacilli present. Liver: caseous tuberculosis. Much bile duct proliferation in the remains of the capsule of Glisson throughout the section. No fibrosis has occurred. Tubercle bacilli are present. Spleen: caseous tubercles almost entirely fill the whole section so that very little splenic tissue is seen. Tubercle bacilli present. Kidneys: shows congestion and haemorrhage. There is much cloudy swelling of cells of the tubules. No tubercles. Tubercle bacilli not found. Bronchial Lymph Nodes: a mass of caseous tubercles. Tubercle bacilli present.

Conclusions: The table shows quite clearly that injections of the wax of the tubercle bacillus in bland emulsion affords no immunity against tuberculosis; indeed, a careful survey of the table leads to the judgment that the duration of life in the guinea pigs of this investigation indicates that the bacillar wax injected in small amounts for a considerable time renders guinea pigs more susceptible to the invasion of the tubercle bacillus. The autopsy findings, even in the animals that died before any bacilli were injected, are also suggestive of an increased susceptibility. The number of pigs in the control is unhappily small and we should be unwilling to insist upon a comparison did not the other series show clearly a progressive increase of susceptibility as the amount of wax administered increases. If we tabulate the life of the pigs of our experiment from the very first injection of any kind and exclude from our comparison all pigs that died before an injection of tubercle bacilli was made we have a very striking set of figures:

Series IV.	Pigs receiving no wax, lived 258, 286 days.	Ave. 272 days.
Series I.	Pigs getting very little wax, lived 242, 329, 213 days.	Ave. 261.3 days.
Series II.	Pigs getting ten times as much wax, lived 197, 238, 309 days.	Ave. 248 days.
Series III.	Pigs getting a hundred times as much wax, lived 172 to 197 days.	Ave. 190.3 days.

The individual figures show much variety, but one pig differs from another pig in many ways, and among them is susceptibility.

Laboratories of the Pennsylvania
Department of Health.

Dec. 15, 1913.

PENNSYLVANIA HEALTH BULLETINS.

No.	Date.	Subject.
1.	July, 1909,	The Disease-Breeding Power of House-flies: Methods of Prevention.
2.	Aug., 1909,	Note on the Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	The Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, Bacillus Coli, and Bacillus Anthracis.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be avoided in the Daily Fight against Tuberculosis.
8.	Feb., 1910,	The Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Pennsylvania. The Results of Four Years' Work of the Department.
10.	April, 1910,	The Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress, and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin, and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	The Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals, and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused, and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly. How it develops, Why it must be Destroyed, and How to Destroy it.
24.	June, 1911,	Effects of Products of Tubercle Bacilli on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Pennsylvania State Department of Health.
27.	Sept., 1911,	Tuberculosis, in the Country as well as in the City, a Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biological Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from Pulmonary Tuberculosis.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects. The Common Forms in Relation to Public Health, and Methods for their Destruction.
33.	Mar., 1912,	The Opportunities for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Conservation of Health. An Address before the Duquesne Chamber of Commerce.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	Tuberculosis and our Schools.
44.	Mar., 1913,	The Relation of the Undertaker to the Public Health.
45.	April, 1913,	What State Control over Streams has done in Pennsylvania in Seven Years.
46.	May, 1913,	Troy Typhoid Fever Epidemic.
47.	June, 1913,	The Registration of Vital Statistics a Social Service.
48.	July, 1913,	Pennsylvania's Eugenic Marriage Law.
49.	Aug., 1913,	Pennsylvania Health Legislation of 1913.
50.	Sept., 1913,	Health and Education. An Address before the Pennsylvania State Educational Association.
51.	Oct., 1913,	Relation of Public Health to Industrial Welfare. An Address before the Welfare Efficiency Conference at Harrisburg.
52.	Nov., 1913,	Bathing.
53.	Dec., 1913,	Results from the Injection of the Wax of the Tubercle Bacillus indicating its Influence on Immunity and Susceptibility to the Tubercle Bacillus.

P4164

PENNSYLVANIA
Health Bulletin

No. 54. HARRISBURG, PA. JANUARY, 1914.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

STANFORD UNIVERSITY LIBRARY
JUN 1 1914
WITHDRAWN

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.
COMMISSIONER.

THE WATERS OF PENNSYLVANIA

An address delivered before the State Board of Agriculture during its meeting at Harrisburg in January, 1914, and published with the consent of the Executive Committee of the Board.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 54. HARRISBURG, PA. JANUARY, 1914.

THE WATERS OF PENNSYLVANIA.

An Address Delivered before the State Board of Agriculture during its Meeting at Harrisburg in January, 1914, by The Commissioner of Health.

Today I want to have an elementary heart to heart talk with you about water and the water courses of Pennsylvania.

We can live longer without food than we can without water. It makes up sixty-six per cent. of our bodies. In its purity as Nature causes it to fall from the atmosphere it is the most healthful of all liquids and the only one which will satisfy the thirst. Without it our blood could not circulate through the vessels of our anatomy. The infant in embryo is fed by blood of which water is such an important part. It must be fed by blood which is clean and pure in all its parts in order to build up a healthy youngster.

Milk, upon which the baby depends for its existence after birth, is made up of ninety per cent. water. Milk is the most satisfying food known for man, yet I have just said 90 parts out of every 100 parts of it are water.

Water is used more than any known liquid. To-day, however, we purpose only to consider it in connection with the health of man and with the health of animals and vegetables which are used directly as food for man. Water is used more largely than any other liquid for drinking. It is used for preparing food for the consumption of man and animals, for the washing of all the utensils used in the handling, storing and transporting of our food stuffs. It is used to irrigate the soil in which is grown the vegetables that we eat without cooking. It is a principal component of all non-alcoholic drinks and liquid medicines. It is a necessity in our homes, in cars for transportation of the public, and in a thousand and one other places and other ways.

With what little I have said about this great commodity which covers the greater part of the globe, you can realize the importance of Pennsylvania's efforts to keep her waters pure. When our General Assemblymen of the Session of 1905 passed the Purity of Waters Act and placed the execution of the work upon the Department of Health, the work was organized by January 1, 1906, so that by January 1, 1907, we had trustworthy statistics of 1906 showing us the number of deaths for that year from typhoid fever alone to be 3,917. No other acute disease occasioned so many fatalities with the exception of pneumonia. These figures meant that out of every 100,000 of our population 56 persons died that year from this water borne disease. In that year there must have been about 40,000 cases of typhoid fever in Pennsylvania nearly all resulting from infected water or from milk which had largely become poisoned by polluted water finding its way into it in one way or another. I want you to try to imagine the suffering of the bodies and souls of our people from this great plague. Typhoid fever gave the doctors more work to do than any other disease and almost as much as all other acute diseases put together.

Independent of the suffering and sorrow of our people the loss by death and the loss of time of those afflicted was causing a loss to Pennsylvania in money value of fifteen millions of dollars a year not including the money paid by the people for the services of doctors and nurses and for medicines and undertakers. Such a condition was a blot on the escutcheon of this Commonwealth. There was no excuse for us after God had blessed us with the riches of our mineral deposits and farm lands and with the greatest streams of pure water of any of the States in the Union. We are censurable. We would not have defiled our food stuffs or food prepared for others to eat, yet because these sparkling, beautiful, pure streams were constantly flowing to the sea, we began to use them as carriers for our filth and refuse in order that it might be carried away from our homes. We did not seem to think of our neighbors down stream who depended upon the water for domestic purposes nor that this same water might be used for drinking purposes both by man and beast after we had so thoughtlessly defiled it.

This condition of affairs went on until the beautiful river Schuylkill has become a stinking sewer. The great Delaware is fast growing into a gigantic conduit for carrying sewage while many of our small streams throughout the State are badly polluted and are guilty of distributing much sickness along their shores. In fact, they have carried great epidemics into our municipalities, leaving death and sorrow in their wakes. It is impossible to understand why we have all so long tolerated this death dealing habit. If we have a half dozen deaths a year in our State from pellagra, the people are excited and almost ready to stampede. A reported case of smallpox in a community usually causes considerable alarm.

Typhoid fever is caused by a micro-organism discovered in 1880 by Eberth. He first found such organisms in the spleen and glands of the intestines and in the liver and kidneys from which they follow the natural discharges of the body. These little vegetable organisms are about 1-125,000 of an inch long. When they get from the intestinal tract or kidneys of a patient into our streams, I know from experience that they may travel fifty miles or more and produce fearful epidemics of typhoid fever in towns even that far down stream from their place of entry.

In Nanticoke we had an epidemic of about 445 cases of typhoid fever with about 44 deaths. All this came from one single case along the water shed about one-eighth of a mile from the stream from which water was taken to supply the borough. On the premises where this case occurred there was a small surface outhouse and a heavy rain washed some of the contents of this surface closet into the stream from which the water company was taking the supply for Nanticoke. When we discovered the cause of this epidemic, the little outhouse was at once removed and the place disinfected all the way to the stream. The reservoir and the water pipes were all disinfected, and as soon as the incubation period passed, the new cases fell off until the epidemic disappeared, but it was too late so far as the hundreds of cases already infected were concerned. The Department of Health at once notified the people of Berwick and Nescopeck, forty miles down stream from Nanticoke, using water from the river upon which Nanticoke is situated, that they should boil all their water. The people were indifferent to the Department's notice with the result that both of these towns had epidemics of typhoid at about the time that I had predicted for such results if proper precautions were not observed. Our Department at that time was young and we had not yet educated the people. Now we find that the citizens of the State have learned to have confidence in us and are co-operating in our efforts to stamp out this deadly disease.

Anthrax is another disease that is carried by water. It prevails extensively in sheep and cattle in various parts of the world. It sometimes occurs in man and is very deadly. This disease is also caused by a vegetable organism discovered by Daraine, a French physician, in 1850. It is about 1-2,000 of an inch in length and is communicated to those who handle hides or wool. Pasture lands become infected with this organism and remain so for years. From these pastures, from slaughter houses, tanneries and places where dead animals are kept, streams are infected.

Tuberculosis is also produced by a vegetable organism which averages about 1-125,000 of an inch in length. This disease is wide-spread over the face of the earth and is killing thousands of the good people of this Commonwealth every year. These organisms also find their way into streams, both large and small, and in some waters may live for quite a while.

Not only do these death dealing germs I have been talking about get into the streams but they also find their way into the springs and wells from which water is used for drinking and for washing our milk vessels. Unfortunate it is for all of us, and particularly those of us who are entrusted with the health of the eight millions of persons in this State, that millions of these organisms may be present in a tumblerful of clear, sparkling water without our being able to see or taste them. Our natural instincts fail utterly to give us warning though the tumbler may be as death dealing as the hemlock draught. Too many of our lay people may be likened to the Indians who said, "No see 'em, no believe 'em!" If a foreign enemy landed on our shores and made an attack upon our lives it would not require much energy to arouse our people to arm themselves and go forth to battle with the invaders, yet I can assure you that it is often discouraging to the health officer, after he has almost exhausted his strength and his patience trying to convince the people that disease organisms are finding more victims every year than were found on the battlefields of the Civil War, still to find the public indifferent, particularly when we know that many of the diseases can be overcome with the intelligent co-operation of the citizens of the State.

I have spoken of the necessity of keeping our waters pure for various reasons, among them that impure water finds its way into milk, a delicate emulsion which Nature intended should be fed from the mother to the offspring without any exposure to air, water or anything that might introduce poisons or germs of disease. Civilized life, however, has broadened its use for food, and milk from animals, particularly from cows, has become one of the most valuable foods for man. Milk makes a good medium for disease germs to live in and multiply and therefore it must be handled with great care and intelligence.

FOOD EQUIVALENTS

TO ONE QUART OF MILK (AT 8 CENTS PER QUART).

	Proteins. %	Carbo-hydrates. %	Fats. %	Caloric Units.	Cost of Amounts Named.
Milk,	3.3	5.0	4.0	654	.08
¾ lb. of lean round of beef,	20.9	....	10.6	626	.17
8 eggs,	13.4	....	10.5	676	.27
2 lbs. of potatoes,	1.9	18.3	0.1	770	.10
7 lbs. of lettuce,	4.2	6.3	0.6	1,191	.50
4 lbs. of cabbage,	1.4	4.8	0.2	488	.08 to .10
2 lbs. of salt codfish,	26.3	....	0.3	980	.80
3 lbs. of fresh codfish,	11.6	....	3.5	708	.45
2 lbs. of chicken,	21.9	....	8.9	1,890	.50
5 lbs. of turnips,	0.9	5.9	0.1	600	.15
1-6 lb. of butter,	1.0	....	85.0	587	.08
1-3 lb. of wheat flour,	11.4	74.8	1.0	550	.01
1-3 lb. of cheese,	25.9	2.4	33.7	650	.10

You can see by this table that milk does not command as high a price in the market in proportion to its food values as do other food stuffs. This apparent lack of proportion calls for an explanation and may be accounted for by the unstable and highly susceptible nature of the product. Milk is a liquid which is easily affected by thermal conditions. Under summer heat in this latitude it soon sours and loses its food value, and, as I have already said, it is a good culture medium for germs of disease. If it becomes contaminated with typhoid germs from infected water, or from dirty hands of persons coming in contact with or nursing those suffering from typhoid fever, or from flies coming from an outhouse where dejecta have been deposited without disinfection it will carry the germs of typhoid fever along the milk route and thus spread an epidemic of the disease. If scarlet fever, smallpox, or any other communicable disease happens to be in the home of those handling the milk, these diseases may also be carried. If the milk is kept in dirty vessels or the dirt from cattle not properly cared for gets into it, chemical substances are produced which are extremely poisonous. Consumers, therefore, have become afraid of milk and try to find substitutes to take its place. Demand has a close relationship to the price an article will bring in the market. From what I have said it must be evident to the dairy farmer that if he will study all things that tend to depreciate the value of milk, it is largely in his power to raise or lower its market value. Keep the streams, wells and springs clean, keep the cattle clean, house them in clean, well ventilated barns, give them out door exercise that their bodies may be free from disease, cleanse your milk utensils thoroughly, keep healthy helpers, keep disease away from your home, or if it does come, keep the milk away from the disease and every one who comes in contact with it. Disinfect all vessels you collect from your customers or, better, use destructible milk containers when you can get them at a low enough price. If you can convince the people that milk has been robbed of its dangers, the demand will become greater and you wlil receive more nearly its true food value. Pure water will help in bringing about this result. Raw milk is more easily digested, but to be used raw, it must be pure.

What I have said about the relationship between pure water and the value of pure milk brings me back to the streams, to their past dirty condition, and to their relationship to the farmer. The intestinal and kidney discharges can be kept out of the streams at a profit and at the same time thousands of cases of sickness and death from typhoid fever can be prevented.

One day last week when I was trying, with many interruptions, to jot down some notes for this talk, I received the following letter:—

Dr. Samuel G. Dixon,
Commissioner of Health,
Harrisburg, Pa.

Dear Dr. Dixon:—It pleases me much to learn that you are to make an address before the State Board of Agriculture January 28th, on "The Waters of Pennsylvania."

Last summer when I was up in Centre County, I heard of a case in which your Department had insisted on a farmer constructing a concrete base and sides to his barnyard manure pit. The tale the farmer tells is this: "The State Board of Health fellows came up here and they made me fix things up, so that the drainage from the manure should not get into the stream. Well, I kicked like a steer but they made me do it. Now, do you know, that ever since I have been kicking myself because I did not do it long before, because the increased value of the manure has paid for the whole thing many times and to think I had been letting that stuff go to waste makes me mad."

Again, on the 10th of this month, I attended a meeting of the Schuylkill County Agricultural and Horticultural Society. One of the old farmers complained of the exactions of the Health Department. He said an official of your Department had visited his farm and gave him but thirty (30) days in which to do the work, i.e., preventing drainage from his barnyard from flowing into the stream. I told him he should have done it long before he was required to by the State.

Dr. Van Slyke of New York, one of the foremost authorities on fertilizers, etc., makes this statement in his recently issued work on the subject. "The value of the loss to the farmers of the United States through the waste of this liquid is $700,000,000 annually, a sum equal to the value of some entire crops."

I hope you will handle this matter without gloves. Some of the farms I have visited are positively unsanitary.

This brings me to the value of the natural fertilizers which mean so much to the success of the farmer. By permitting them to be washed into the streams they are carried away, never to return to the soil from which they originally came; yet, if they are carried into some public water supply, they may be returned to produce epidemics of typhoid fever when farmers serving milk carry the germs of the disease back to the dairies in the milk bottles collected from their customers.

The manure from horses, cattle, sheep and hogs is rich in nitrogen and carries some phosphoric acid and potash, differing somewhat in proportion with the varieties of animals mentioned. Its value in dollars and cents varies, depending upon the way in which the animals are fed and upon the geographical situation of the farm. Near our large markets it brings good prices. What I want to impress upon you, however, is that the liquid which so often is permitted to run off into the streams is generally worth at least three times as much as the dry manure, and if you permit the rains to dissolve out the nitrogen and carry it away, you will often find the drainage from your barnyard worth five times as much as what you have left to haul out on your fields. If a farmer is unable to haul the manure out every day or so, he can well afford the labor necessary to retain this valuable liquid. Such work will bring an immediate result and save money that would otherwise go for artificial fertilizers.

If you do not retain the natural liquids and those dissolved out by the rains, your crops will fall short or you will have to take the cold cash and purchase artificial fertilizers which do not take the place of good, well kept manure. You will not get the humus nor will you keep up the biological standard and general physical conditions of your soil. If you will keep the manure in water tight pits, well packed and moist, your expenses will come back to you tenfold and at the same time you will be your brother's keeper by preventing your sewage from getting into his water supply and making him sick with maybe one or another of many intestinal diseases. You can co-operate with the health authorities, make more out of your land and save others and yourselves much sickness, sorrow, yes, death.

PENNSYLVANIA HEALTH BULLETINS.

No.	Date.	Subject.
1.	July, 1909,	The Disease-Breeding Power of House-flies; Methods of Prevention.
2.	Aug., 1909,	Note on the Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	The Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, Bacillus Coli, and Bacillus Anthracis.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be avoided in the Daily Fight against Tuberculosis.
8.	Feb., 1910,	The Object to be Attained by the Medical Inspection of School Children.
9.	Mar., 1910,	Conservation of Human Life in Pennsylvania. The Results of Four Years' Work of the Department.
10.	April, 1910,	The Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress, and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experimets on Tubercle Bacilli, Old Tuberculin, and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	The Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals, and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused, and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly. How it develops, Why it must be Destroyed, and How to Destroy it.
24.	June, 1911,	Effects of Products of Tubercle Bacilli on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Pennsylvania State Department of Health.
27.	Sept., 1911,	Tuberculosis, in the Country as well as in the City, a Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biological Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from Pulmonary Tuberculosis.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects. The Common Forms in Relation to Public Health, and Methods for their Destruction.
33.	Mar., 1912,	The Opportunities for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Conservation of Health. An Address before the Duquesne Chamber of Commerce.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	Tuberculosis and our Schools.
44.	Mar., 1913,	The Relation of the Undertaker to the Public Health.
45.	April, 1913,	What State Control over Streams has done in Pennsylvania in Seven Years.
46.	May, 1913,	Troy Typhoid Fever Epidemic.
47.	June, 1913,	The Registration of Vital Statistics a Social Service.
48.	July, 1913,	Pennsylvania's Eugenic Marriage Law.
49.	Aug., 1913,	Pennsylvania Health Legislation of 1913.
50.	Sept., 1913,	Health and Education. An Address before the Pennsylvania State Educational Association.
51.	Oct., 1913,	Relation of Public Health to Industrial Welfare. An Address before the Welfare Efficiency Conference at Harrisburg.
52.	Nov., 1913,	Bathing.
53.	Dec., 1913,	Results from the Injection of the Wax of the Tubercle Bacillus indicating Influence on Immunity and Susceptibility to the Tubercle Bacillus.
54.	Jan., 1914,	The Waters of Pennsylvania. An Address before the State Board of Agriculture.

Pennsylvania Health Bulletin

No. 55. HARRISBURG, PA. FEBRUARY, 1914.

Entered as second-class matter, August 9, 1909, at the post-office at Harrisburg, Pa., under the Act of July 16, 1894.

PUBLISHED MONTHLY BY
THE STATE DEPARTMENT OF HEALTH
SAMUEL G. DIXON, M. D., LL. D.,
COMMISSIONER.

REPRODUCTION AND RACE BETTERMENT.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

PENNSYLVANIA
Health Bulletin

PUBLISHED MONTHLY BY THE STATE DEPARTMENT OF HEALTH.
SAMUEL G. DIXON, M. D., LL. D., COMMISSIONER.

No. 55. HARRISBURG, PA. FEBRUARY, 1914.

REPRODUCTION AND RACE BETTERMENT.

To produce vigorous infants, it is essential that both parents should possess good constitutions, unenfeebled by excessive intellectual or corporeal exertion, or by any chronic disease. An organic law of nature is that the germ of the infant-being must be complete in all its parts, and in a perfectly sound condition, as an indispensable requisite to its vigorous development, and full enjoyment of existence. More depends upon this than is commonly thought. A man with good tissue will resist disease much longer and react more rapidly and perfectly than one with poorly formed cells. It is not easy to decide the line of influence imparted to these by the male and female respectively.

Dr. Pritchard in his Physical History of Mankind observes, children resemble in features and constitution both parents, but more generally the father. In the breeding of horses and oxen great importance is attached by experienced propagators to the male. In sheep it is commonly observed that black rams beget black lambs. In the human species also the complexion follows more especially that of the father, and it is stated as a general fact that the offspring of a black father and white mother is darker than that of a white father and black mother.

It has long been a prevalent idea that certain parts of the organism are derived from the male, and certain other parts from the female parent; and although no universal rule can be laid down upon this point, yet the independent observations which have been made by numerous practical breeders of domestic animals, seem to establish that such a tendency has a real existence, the characters of the animal portion of the organism being especially (but not exclusively) derived from the male, and those of the organic apparatus being in like manner derived from the female parent. The former will be chiefly manifested in the external appearance, in the general configuration of the head and limbs, in the organs of the senses (including the skin), and in the locomotive apparatus; whilst the latter show themselves in the size of the body (which is primarily determined by the development of the viscera contained in the trunk) and the mode in which the vital functions are performed. Thus the mule, which is the produce of the male ass and the mare, is essentially a modified ass having the general configuration of its sire, slightly modified by equine peculiarities, but possessing the rounder trunk and larger size of its dam. On the other hand the hinny, which is the offspring of the stallion and the she-ass, is essentially a modified horse, having the general configuration of the horse, though with a slight admixture of asinine features, but being a much smaller animal than its sire and thus approaching its dam in size, as well as in the comparative narrowness of its trunk.

A striking and undeniable proof of the effect on the character and disposition of children, produced by the form of brain transmitted to them by hereditary descent, is to be found in the progeny of marriages between Europeans, whose brains possess a favorable development of the moral and intellectual organs, and Hindoos, or our American Indians, whose brains are inferior. All authors agree and report the circumstances as very remarkable, that the children of such unions are decidedly superior in mental qualities to the native, while they are still inferior to the European parent. In some instances the offspring is better suited to life in the country where it is born, than its foreign ancestor, so that inheriting from its native progenitor a certain adaptation to the climate, and from its foreign parent a higher development of brain it possesses a marked superiority over both the stocks from which it originated. A further example of this inheritance of superior qualities occurs in Persia, where it is said a custom has existed for ages among the nobles, of purchasing beautiful Circassian captives, and forming alliances with them as wives. It is well known that the Circassian form of brain stands comparatively high in the development of the moral and intellectual organs, and travellers tell us that the race of nobles in Persia is the most gifted in natural qualities, both bodily and mentally, of any class of that people, a circumstance diametrically opposite to what we notice in Spain and other European countries, where the nobles intermarry constantly with each other, and set the organic laws of inherited feebleness altogether at defiance. The degeneracy and even idiocy of some of the noble and royal families of Spain and Portugal from marrying nieces and other near relations, in spite of ill health, is well known, and in all these cases defective brains have been observed.

Many facts illustrate the influence of the parents, particularly of the mother, at the time when the existence of the child commenced, on its mental powers and disposition. Thus for example the murder of David Rizzio was perpetrated by armed nobles, with many circumstances of violence and terror, in the presence of Mary Queen of Scotland, shortly before the birth of her son, afterwards James I. of England. The constitutional liability of this king to emotions of fear is recorded as a characteristic of his mind, and it is narrated of him that to the day of his death he was unable to endure, and would start involuntarily at the sight of a drawn sword. Queen Mary his mother was not deficient in courage, and the Stuarts both before and after James I. were distinguished for this quality, so that his disposition was an exception to the family character. Further evidence to the same effect is afforded by the following narration. A woman's first child was of sound mind, but subsequent to its birth the father had a fall from his horse, by which his head was much injured, and his next two children proved to be idiots; after this the father was trephined with complete success, and had other children all of whom were of average intelligence.

Still another illustration of the same law is found in the fact that where two persons marry too young, the eldest of their children inherits a less favorable development of the moral and intellectual organs than those produced in mature age. The organs of men are generally most vigorous in early life and this energy seems to cause them to be the most readily transmitted to offspring. Indeed it is difficult to account for the wide varieties in the form of the brain in children of the same family, except on the principle that the faculties and propensities which predominate in vigor and activity in the parents, at the time when existence is communicated, determine the tendency of corresponding physical and mental attributes to develop themselves largely in the children. 'Dr. Combe judiciously suggests that a man and woman about to marry, have in the generality of cases the health and happiness of five human beings dependent upon their intelligent comprehension of and strict attention to the laws of sexual hygiene, and yet how much less scrupulous are they in risking the partial or complete loss of this invaluable trust, confided to their care, than are speculators in the investment of their pecuniary resources. There can be no doubt that children of individuals who have obeyed the organic, the moral, and the intellectual ordinances of their beings, will not only start in their battle of life from the highest level in acquired knowledge of their parents, but they will inherit a tendency towards an enlarged development of the moral and intellectual faculties and thereby enjoy an increased and increasing capacity for discovering and obeying the inexorable laws which govern the existence of all animated nature.

Coming now to the detailed hygiene of sex, it is to be observed that the institution of marriage as the pre-requisite of an established family is one of the earliest forms of social life with which we are acquainted and indeed appears to be the primary departure from ancient savage existence. The family is the type of the state. Society is defined by moralists as the congregation of many men for the object of acquiring greater power by their united efforts. Just laws are made by society for the good of all, and every rational member of society must recognize the obligation to obey, uphold and enforce them.

When man arrives at adult age acquiring the power of generation, he instinctively desires to protect, support, and cherish both the woman who co-operates with him in procreation, and the children, parts of his own flesh and blood, which she bears to him. These relations form the basis of the family which in its turn forms the foundation of the State.

In the third period of human existence, that of old age, the same imbecility, the same infirmity seen in infancy, recurs. Now again, as in infancy, if society did not come to the rescue, the aged, weak and perchance afflicted with various diseases, and thus rendered unable to protect themselves, or to procure their food, would soon perish by violence or by starvation.

Society, which you thus perceive is absolutely requisite for the continuance of our present civilization, is divided into domestic and civil, the former, which is the subject of our special study, being that of the family, the latter that of the State. This brings us to the consideration of the hygiene of married life. How little most persons ever think of the power which they have over the destiny of those who spring from them. How reckless they show themselves in this regard. They have continually before their eyes the fact that by care and attention the most important modifications may be produced in the constitution and character of the animals over which they have dominion, that by selection in breeding, an animal may be almost transformed in the course of a few generations; they perceive the striking contrast between the low savages (kinship with whom they most unwillingly confess) and the best specimens of civilized culture, and yet they well know nevertheless that such as the savage is now, such were their ancestors once; they may easily if they will discover examples which show that by ill-living, whole nations may degenerate until they revert to a degraded state of barbarism, disclosing their former greatness only in the magnitude of their moral ruins, and yet seeing these things, they never seriously take account of them, and apply to themselves the lessons which lie upon the surface. They behave in relation to the occult laws which govern human evolution, very much as primeval savages behaved in relation to the laws of physical nature, of which they were entirely ignorant; they are content with superstitions, where they should strive to get understanding and to exert intelligent will. They act altogether as if the responsibility for human progress upon earth belonged entirely to higher powers, and not at all to themselves. If man could only be brought to see and realize that he is actually determining daily and hourly by his conduct in his generation what shall be pre-determined respecting the constitution of the generations to follow him, he would use his reasoning powers in every step in life. Far too many pay no regard to the evils which by errors in sexual hygiene they bring upon their children. When through more enlightened education, parental responsibility shall be more generally comprehended, not only disease, but crime will diminish, and in time we may produce if not a higher species of being than we are, at any rate a race of men and women as superior to us as we are now superior to our primeval ancestors. There are many infirmities which do not prevent marriage from being fully accomplished, and are therefore no just bar to conjugal union, but there are many others, such as malformations and inoculable diseases, which totally disqualify persons from entering into the matrimonial contract. The study of such imperfections, and the methods of remedying them, when not irremediable, belong in great measure strictly to the practice of medicine or surgery, although hygienic treatment is often no unimportant adjunct to medication, but the methods of retaining the powers of reproduction in their fullest vigor, and for the longest possible time, come under the title of Sexual Hygiene.

It is obvious that one of the first divisions of our inquiry must be in regard to the suitable age and conditions of life at which the bonds of matrimony may be assumed. First, a man should not marry unless into a family with a history of reasonable longevity, free from hereditary disease. He should not marry a woman advanced in life, delicate, feeble, or afflicted with any inherited de formity. The age most proper for women in this climate is nineteen or twenty years, and for men twenty-four or twenty-five years. Women of a nervous temperament, those who are extremely irritable, hysterical, subject to convulsions, or to epilepsy from organic disease, ought to avoid matrimony. This last precept, however, is liable to important exceptions, as nervous and hysterical women, not subjects of any organic disease, are often cured by marriage, and bring forth healthy infants whose chance of life is at least equal to the average. The ancient Germans did not marry until twenty-four or twenty-five years of age, and previous to that time observed the most rigid chastity. As a consequence of this, their progeny attained a remarkable size and strength, exciting the astonishment of the Roman generals, who fought with them, as is mentioned both by Julius Caesar and Tacticus. No positive rule can be given, however, as to age, because some individuals are much more developed at eighteen or twenty than others at twenty-five. In tropical countries it is quite common to see girls married at eight or nine years, and mothers at ten, whilst in the frigid zones, menstruation, (which marks the earliest permissible age for marriage), is not usually established until about the eighteenth year. In this country matrimonial contracts between the sexes before the ages of twenty-five and nineteen respectively, are contra-indicated, because as a rule previous to those periods of life, the body is not fully developed, the different functions are not perfect, and the sexual organs being only in progress of their growth, any offspring developed by them in their immature condition, must be deficient in vital power. This is the more to be avoided because according to a law of our being, premature or excessive exertion of any part of the body, is succeeded by exhaustion or decay of that part, especially if such exercise is undergone much before complete development has taken place.

In regard to marriages later in life, it has often been observed that middle aged parents, provided they are vigorous and in good condition, procreate much more vigorous children than younger couples who have become debilitated by early excesses. It is often better to be old in years than in constitution. Feeble parents propagate robust looking children but they seldom survive the period of manhood, and old age is for them almost out of the question. I think there is no doubt that marriage is conducive to longevity, provided the candidate is a healthy, well-formed male between the ages of twenty and sixty. The dangers of pregnancy and childbirth so complicate the question in regard to females that it is difficult to arrive at a positive conclusion. The managers of some Life-Insurance Companies whose important pecuniary interest it is to judge in the most accurate manner of the chances of life under varied circumstances, refuse to insure the lives of pregnant women. The chief examiners in general decline to insure women who are pregnant for the first time. According to their tables the chances of death during confinement, in women pregnant for the first time is one in 62, whilst the general mortality of women in labor is but one in 124, or only half as great as in the primiparae.

According to an eminent authority, the principal sources of degeneracy which appear at present to be most active in the world in their influence for evil on large masses of mankind may be advantageously grouped as follows:—

1st. Degeneracy from toxaemia, or from the abuse of alcoholic fluids, opium, preparations of Indian hemp (hasheesh), preparations of coca (cocain), tobacco and the like; also from the effects of lead, mercury, arsenic, and phosphorus; and from the use of unwholesome vegetable food, such as diseased rye, maize, wheat and the like.

2nd. Degeneracy from the persistent, pernicious influence of malaria.

3rd. Degeneracy from certain peculiar geological formations, soil and water, as in the development of goitre.

4th. Degeneracy from the effects of diseases which now and then afflict large populations, profoundly influencing the system, and engendering those morbid temperaments whose types are fully expressed in those generations which follow the one which has suffered from such epidemic pestilences. Many such epidemics act like toxic agents on the nervous system.

5th. Degeneracy from the effects of the great town system, as it is called. The chief elements of such degeneration are: unhealthy situations; a noxious local and general atmosphere; insufficient air; insufficient and improper nourishment; deleterious avocations; moral and social misery, wretchedness and crime.

6th. Degeneracy from fundamental morbid states congenital or acquired, as seen in imperfect cerebral developments, deaf-mutism, blindness, constitutional diseases and diatheses, implanted, hereditary or acquired, such as syphilis and scrofulosis.

7th. Degeneracy from mixed causes, too close marrying in and in. It is this last factor that we will now consider.

The literature on in-breeding is in such a state of chaos that it would be hard to draw a conclusion as to just how far it can be carried with any degree of safety. My experience has taught me that the result with cattle and dogs is not favorable. After having bred over two hundred dogs, the record shows that in no case where inbreeding was carried on into the third generation did the animals possess the full vigor of their ancestors. Whenever they were overtaken with acute diseases the death rate was half as high again as in those not interbred. A like result was obtained with the interbreeding of cattle. It is interesting to note that in the cattle if there was shown any particular weakness, inbreeding invariably exaggerated it. If we apply this last effect to mankind in its present diseased state and permit intermarriage, there will be a multiplication of any particular weakness. After this experience I have just mentioned, it is obvious that my advice would always be against inter-marriage, varied of course according to the degree of relationship and the health of the respective parties.

PENNSYLVANIA HEALTH BULLETINS.

No.	Date.	Subject.
1.	July, 1909,	The Disease-Breeding Power of House-flies; Methods of Prevention.
2.	Aug., 1909,	Note on the Similarity of Barium Carbonate Poisoning and Rabies in Dogs.
3.	Sept., 1909,	The Family Physician.
4.	Oct., 1909,	Legal Rights and Tuberculosis. The Public Drinking Cup.
5.	Nov., 1909,	The Germicidal Effect of Water from Coal Mines and Tannery Wheels upon Bacillus Typhosus, Bacillus Coli, and Bacillus Anthracis.
6.	Dec., 1909,	Report on the Effect of Repeated Injections of Products of the Tubercle Bacillus on Lymphatic Organs.
7.	Jan., 1910,	Little Dangers to be avoided in the Daily Fight against Tuberculosis.
8.	Feb., 1910,	The Object to be Attained by the Medical Inspector of School Children.
9.	Mar., 1910,	Conservation of Human Life in Pennsylvania. The Results of Four Years' Work of the Department.
10.	April, 1910,	The Biological Treatment of Tuberculosis as Conducted by the Department.
11.	May, 1910,	The Bubonic Plague, its Origin, Progress, and Means of Prevention.
12.	June, 1910,	A Retrospective Glance. 1. Susceptibility to Tuberculosis. 2. Purity of Milk. 3. Bovine Tuberculosis.
13.	July, 1910,	Experiments on Tubercle Bacilli, Old Tuberculin, and the Fluid of Dixon.
14.	Aug., 1910,	The Conservation of Child Life in Pennsylvania.
15.	Sept., 1910,	Obedience to Nature's Laws the Primary Defence against Disease.
16.	Oct., 1910,	The Conservation of Infant Life in Pennsylvania.
17.	Nov., 1910,	Pennsylvania's Standing Army of Health.
18.	Dec., 1910,	Producers and Consumers. Pennsylvania's Tuberculosis Schools.
19.	Jan., 1911,	The Effect of Injections of Taurin upon Tumors of Mice and Dogs.
20.	Feb., 1911,	Some Duties, Ideals, and Opportunities of the Country Doctor.
21.	Mar., 1911,	Malaria; How it is Caused, and How to Get Rid of it.
22.	April, 1911,	Health.
23.	May, 1911,	The Common Fly. How it develops, Why it must be Destroyed, and How to Destroy it.
24.	June, 1911,	Effects of Products of Tubercle Bacilli on Epithelium.
25.	July, 1911,	Five Years of Tuberculosis in Pennsylvania.
26.	Aug., 1911,	Organization of the Pennsylvania State Department of Health.
27.	Sept., 1911,	Tuberculosis, in the Country as well as in the City, a Disease of Bad Housing and Lack of Nourishing Food.
28.	Oct., 1911,	The Preparation of the Biological Products Distributed by the Pennsylvania Department of Health.
29.	Nov., 1911,	The Foundations of State Medicine.
30.	Dec., 1911,	Experiments Tending to Show the Infrequency of the Occurrence of Tubercle Bacilli in the Urine of Patients Suffering from Pulmonary Tuberculosis.
31.	Jan., 1912,	The Baby the Most Important Problem in Modern Life.
32.	Feb., 1912,	Insects. The Common Forms in Relation to Public Health, and Methods for their Destruction.
33.	Mar., 1912,	The Opportunities for the Trained Nurse in Sanitary Service.
34.	April, 1912,	How to Organize a Baby-Saving Show.
35.	May, 1912,	Drowning.
36.	June, 1912,	The Health of Suburban Residences.
36½	July, 1912,	Report of the Austin Disaster.
37.	Aug., 1912,	Getting Close to the People. Caring for the School Children.
38.	Sept., 1912,	Modern Medicine and the Physician.
39.	Oct., 1912,	Battling for Life at Mont Alto.
40.	Nov., 1912,	Tuberculin.
41.	Dec., 1912,	Conservation of Health. An Address before the Duquesne Chamber of Commerce.
42.	Jan., 1913,	Municipal Sanitation.
43.	Feb., 1913,	Tuberculosis and our Schools.
44.	Mar., 1913,	The Relation of the Undertaker to the Public Health.
45.	April, 1913,	What State Control over Streams has done in Pennsylvania in Seven Years.
46.	May, 1913,	Troy Typhoid Fever Epidemic.
47.	June, 1913	The Registration of Vital Statistics a Social Service.
48.	July, 1913,	Pennsylvania's Eugenic Marriage Law.
49.	Aug., 1913,	Pennsylvania Health Legislation of 1913.
50.	Sept., 1913,	Health and Education. An Address before the Pennsylvania State Educational Association.
51.	Oct., 1913	Relation of Public Health to Industrial Welfare. An Address before the Welfare Efficiency Conference at Harrisburg.
52.	Nov., 1913,	Bathing.
53.	Dec., 1913,	Results from the Injection of the Wax of the Tubercle Bacillus indicating its Influence on Immunity and Susceptibility to the Tubercle Bacillus.
54.	Jan., 1914,	The Waters of Pennsylvania. An Address before the State Board of Agriculture.
55.	Feb., 1914,	Reproduction and Race Betterment.

THE HECKMAN BINDERY, INC.
BOUND TO PLEASE

DEC 77

N. MANCHESTER,
INDIANA